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NEWS IN BRIEF
Home market 'in billions'

DEVELOPMENTS in home computers and video tape recorders could lead to the emergence of a new billion-dollar market for integrated video terminals which might eventually be dominated by companies like Texas Instruments and IBM rather than by current home computer and television manufacturers.

According to a study by the US consultancy International Resource Development Inc, the VTR will integrate the home telephone, TV set, personal computer and video tape recorder and will bring about significant changes in the publishing, consumer electronics, broadcasting and telecommunications industries.

The study, *The Home Terminal*, is published by International Resource Development Inc, 125 Elm Street, P.O. Box 1131, New Canaan, Connecticut, 06840, USA.

Taxmen's fear

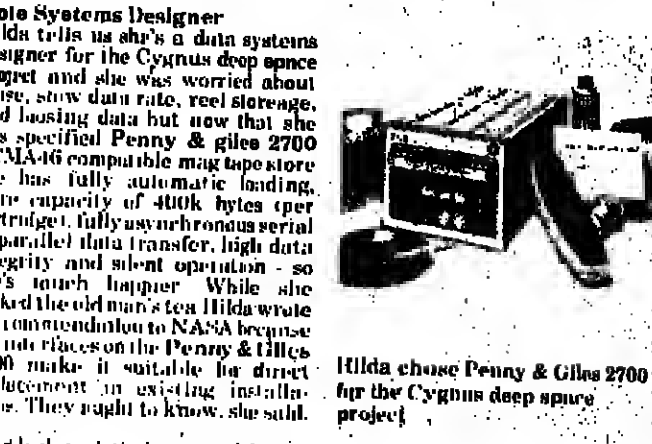
CONCERNED that a change in the tax collecting system and the introduction of computers may result in the loss of jobs and career paths for its members, the Inland Revenue Staff Federation is calling a special delegates conference next week. The federation says concentration of work at computer centres is resulting in loss of jobs in local offices and the federation wants to establish the right of its members to jobs resulting from transfer of workloads.

DEC double

A ONE Megabyte double density floppy disc subsystem has been introduced by Digital Equipment for use with PDP-8 and PDP-11 minicomputers.

Penny & Giles give paper tape punches the boot ... Wigan housewife grateful for it!

Penny & Giles data cartridge direct function and low cost replacement for the paper tape punch has pleased Wigan housewife Hilda Birtwhistle (33) who says she's very grateful for it.



Hilda chose Penny & Giles 2700 for the Cynus deep space project. They ought to know, she said.

Good luck with the housework Hilda

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COMPUTER WEEKLY
Cincom gives details of next generation of DBMS

THE developer of the database management system Total, Cincom Systems, has announced details of its next generation of DBMS software, and a new level of environmental independence.

The system, called Total Information System, TIS, provides high level facilities for all aspects of information management. These are implemented by a user-oriented superstructure on top of traditional DBMS software.

The key component of the system is a data directory, which links the data to the underlying database. The TIS directory, in effect an active data dictionary, permits both end users and applications programs to take a purely logical view of the data they use.

In its first release, due next year, TIS will include facilities for creating and maintaining the directory as well as initial versions of two of the four main superstructure components. These will be components for information retrieval and database management.

To be implemented initially for IBM mainframes, the system will include a DBMS component, a modified form of the latest IBM 380/370 version of Total, Release 9.0 (CW, June 18). This is described by Cincom as the "engine" which will drive TIS.

The system will later offer two further groups of facilities: an end user language for database updating, and facilities for communications management.

The company, which describes TIS as "the greatest breakthrough in systems software since database management," first took shape at a major presentation on the system at a users' group meeting in its home town, Cincinnati, Ohio.

It also gave a demonstration of the directory maintenance system and the online query language, which has been under development for over two years.

Received with enthusiasm by the users at the meeting, the TIS announcement was seen by many as countering increasing IBM emphasis on its strategic software line, IMS and MVS.

£40m from NEB to back office of future

AN investment of £40 million is to be made by the National Enterprise Board in a new venture into the advanced office systems market, and to start off its activities, the NEB is to take over worldwide marketing of Logica's recently announced stand-alone word processor, VTS/100.

The NEB's plans are to set up a marketing organisation for "Office of the Future" systems along similar lines to Inscat, the software consortium. Advanced office information systems incorporating word processing, electronic filing, and electronic mail are seen as a growth area of enormous potential, in which the UK has a chance of getting a worldwide lead.

Among foreign companies, Xerox in particular is known to be working on development of these systems, but is still some way from the marketplace.

The new organisation, as yet unnamed but known jocularly in the industry as "Intray", will draw on the expertise of UK systems houses, particularly Logica, but possibly including Systime, and also minicomputer manufacturers such as CIL.

Logica's VTS/100 is an up-market screen word processor with communications facilities, based on the Intel 8080



micro (CW, June 1). The hardware is designed and assembled entirely by Logica. The machine was originally intended as a communicating terminal for Unicom, the shared-logic word processing system, but is now being sold separately as well. The NEB will not be involved in selling Unicom.

Stephen Dawson, the NEB's man dealing with this area, could not confirm any specific plans, other than the overall aim and the fact that talks are taking place. He agreed that the real electronic office is still a long way in the future, but he added, "There is a lot of business to be done in the meantime."

Later on the NEB is expected to sell Logica's projected clustered system, VTS/400.

International trial

ORDERS for several hundred supermarket check-out terminals and related back-up systems could result from a year's trial being carried out by the International grocery chain, a subsidiary of the British American Tobacco group.

This week the latest step in the pilot project went into operation at Folkestone where 10 IBM 3880 terminals are installed with an online link to IBM's Warwick data centre to provide back-up.

This system will be matched against an upgraded NCR 285 installation at International's Weymouth superstore in Dorset.

BOC goes for 2976

THE big BOC Dataolve bureau has changed its mind about a second ICL 2970, and will instead replace its existing 2970 with the new 2976, running under the 5332 release of the VME/B operating system.

The 2976 is effectively a 2972 with interleaved main memory, and incorporates the same order processor as the 2980.

The bureau is also implementing a system that enables users to access concurrently the 2970 and the IBM 404 and Amdahl mainframes at its Sunbury-on-Thames centre via an ICL 2904 in its City office. The system was developed by ICL for the Marine Midland Bank in New York, to talk to both its IBM 380s in the US and 1900s in London.

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Low-cost OEM Classic

THE low-cost OEM version of Multicomp's new Classic line of minicomputers has been formally announced as the Classic 7810.

The mini, priced at £2,280 as a single-board processor with 32K words of MOS memory, and £5,200 packaged in a chassis with power supply, effectively replaces the Modcomp II, featuring the full instruction set and running under MAX II and MAX III operating systems.

Modcomp has configured a flexible plant control and data acquisition system around the new mini. Called Modas III, the system is designed as a multi-processor distributed plant control system, and each unit can monitor up to 2,048 control points.

The basic unit includes 7810 processor, computer to computer communications link, a direct memory processor, and I/O controller, and costs £1,100.

CGA criticised by MPs

FOLLOWING the Auditor-General's criticism of ICL (CW, Feb 23), the House of Commons Public Accounts Committee has criticised the government's Central Computer Agency for failing to inform Ministers adequately about the likely additional costs to the taxpayer of buying untried 2900 machines under the preferential procurement policy.

This committee described as "a negation of sound administration."

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Briefing

Taxmen call off action

A THREAT to the continued processing of PAYE at the Inland Revenue computer centre at Cumbernauld, Scotland, has been averted, following a decision by the Inland Revenue Staff Federation not to step up action in a dispute with the Inland Revenue over union representation.

The Inland Revenue Board wants its 200 staff that work with computers to be free to leave IRSF and join the Society of Civil and Public Servants.

Chairman resigns

DR Bill Willetts, chairman of Plessey Telecommunications, and a member of the Plessey board, is resigning to become an assistant managing director of Vickers. Last month, Des Picher, formerly with Unicom and most recently managing director of Logica, was appointed managing director of Plessey Telecommunications (CW, September 14).

Meanwhile neither Plessey nor GEC has anything further to add to last week's statements on the possibility that Plessey Semiconductors might be bought by GEC (CW, October 12).

BOS talks

THE British Computing Society is to discuss this week a report on the future requirements of DP undertaken earlier this year by the BCS future requirements committee (CW, April 6). The committee has been critical of the failure of the BCS to publish the report or to take its findings into account in the society's future plans and it is hoped to assess future action in the report at this week's meeting, which takes place after Computer Weekly has gone to press.

Pricing trials

PROPOSALS from makers of data collection equipment are now being sought for hardware for the experiment next year in computerisation of the Prescription Pricing Authority (CW, March 2). The computerisation project, run jointly by the DHSS and the PPA, is to run trials of different ways computer systems could help in the assessment of chemicals' costs, and staff have decided that one of three methods of data capture will probably be used: key to disc, bar codes and light pens, or an interactive system using intelligent terminals.

Intel new chief

NEW managing director of Intel, the computer-based stock exchange system for institutional investors, is to be Garry Arnott, a consultant with N. M. Rothschild, who will succeed Colin Leach, who was largely responsible for setting up the system, resigned at the end of last month (CW, October 5). In his last financial year, Intel recorded profits of £104,000, compared with a loss of £87,000 in 1976-77, and dealt in stocks worth £100 million, up from £84 million last year.

COMPUTER WEEKLY

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'Lucky 13th' Charity Ball raises £1,000

FRIDAY the 13th last week turned out to be a lucky day for those attending the third annual Computer Weekly Charity Ball in London. The ball coincided with the celebration by the British Computer Society of its 21st birthday and the new BCS president, Professor Frank Sumner of Manchester University [right] got his year of office off to a pleasant start when he cut the birthday cake shortly after midnight.

Over £1,000 was raised by the ball, which was attended by more than 700. The money will be allocated to one or a number of projects agreed between the BCS and Computer Weekly aimed at increasing awareness in schools of the use of computers.

● This week two other organisations celebrate anniversaries — ICL (page 18/17) and Gintrom (back page).

Gas WP plans wait for unions

AMBITIOUS plans are being put forward for a large shared-logic word processing system at the Solihull headquarters of West Midlands Gas, including links to a mainframe, a phototypesetter, and a microwave communications circuit. But before the plans can go forward, union consent must be obtained, and the lack of any agreement at national level on the staffing implications of WP means implementation will probably be held up for many months.

An order has been placed with AES Wordplex for a 21-station screen-based system, conditional on the union's agreeing to the plan. This equipment would replace a large number of UDS paper tape machines that have been in use at West Midlands Gas for some years for the production of standard letters to customers, and the like.

System failure hits company

A LACK of communication between the Scan bureau and its former client, the Credit and Commerce Insurance Company, has been blamed by both parties for the complete failure of a system operated by Scan for the insurance firm.

Scan, part of the ORC Group, started developing the policy maintenance system for Credit and Commerce in January and, according to Scan's managing director, Peter Clarke, problems started in April when the system was partially implemented and was starting to go live.

Clarke told Computer Weekly that the problems were caused partly by a lack of communication with the client and also by the lack of a sufficiently well

discussed with unions next week.

The machines that would be used at North Western Gas are reportedly two Adler Tasa 600S units — screenless word processors that use magnetic cassettes for storage. It is questionable whether experience with them could be applied to a large-scale centralised system such as the Wordplex 7.

In charge of office services at

● Turn to page 22

Infant Seelmos 'strangled'

THE infant French national semiconductor company Seelmos, similar to the NEB's Inmos, has been strangled at birth, and the French industry ministry now favours bilateral links between French and US companies. Thomson is to develop several different bipolar semiconductor families, and is likely to buy technology from Motorola, Matsushita and Harris are discussing collaboration with Seelmos, says a spokesman for the ministry.

IBM wants a new building for 400 sales and sales support staff for its Northern region, and will now start looking again for alternative sites in the area.

Wordwright may go out of business

ANOTHER victim of the increasingly hot competition in the crowded word processing market is expected to be Wordwright, the supplier of shared-logic systems and bureau services.

Confirming that Wordwright was likely to go out of business, a spokesman said that the parent company, British Printing Corp., was reviewing its policy on word processing, but would probably not make a definite decision until the end of the month.

BPC has been thinking of selling Wordwright for some time. The firm offered either shared-logic screen word processing systems, or a bureau service for those who did not want to invest in their own processor and storage hardware. Wordwright

COMPUTER WEEKLY'S INSIDE NEWS

TEN YEARS' HARD
It's now 10 years since ICL was attached together at the behest of the Ministry of Technology. In that decade there have been plenty of trials and tribulations for those who have worked to create a viable company, and the present managing director, Dr Chris Wilson, is confident that they are now on the right road. During an interview with Tim Palmer he forecast that in another five years ICL will be a £1,000 million company. To mark this 10th anniversary Fred Leonard has taken over as chief executive, and has set out the company's objectives for the next five years.

DATABASE DESIGN
As a prelude to a 10-part series on structured design and relational databases, the author, Max Stewart, discusses the need for a structured approach to database design. He looks at the need for databases in just two areas: planning and production environments.

ALSO
Computer news at ICL's 10 years
Page 18/17
The way of the BCS
Page 18/17

APPOINTMENTS
PAGES 24-26

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IBM drops plan for Manchester centre

FOLLOWING rejection by Trafford Borough Council of IBM's planning application for a large marketing support centre at Bowdon, near Manchester, the company has abandoned the plan.

Local opposition was fierce to the proposed 20-acre development for a large office building, which it was claimed would have encroached on a Green Belt.

IBM wants a new building for 400 sales and sales support staff for its Northern region, and will now start looking again for alternative sites in the area.

Eddie Nixon, UK managing director, said the company much regretted having to withdraw.

"We were firmly of the view that we would have been able to make a major contribution to the local community and environment. Had we not been given the clear indication that we would find support for this view, we would not have lodged the application in the first place," he said.

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To be launched with a bang

FOREIGNERS, particularly Americans, really are poor sports, aren't they. Nasty people in the US semiconductor industry, sulking at us trying to join their game, ore circulating malicious rumours about the name that they claim is going to be given to Inmos's first product. Since it will be designed and manufactured in two different countries, they say it is going to be called Concorde — the world's noisiest and most expensive 64K RAM. They're just sore because we've got a two-year tail start on them.

Talking about names for things, why do you suppose it is that IBM always insists on calling things something completely different from what everyone else calls them? Or using the same names to mean different things?

What everyone else calls "distributed computing", IBM calls "cooperative network systems". To non-Blue people, "personal computing" means a computer that sits on your desk or bedroom table; to IBMers it means something using vast mainframes. One of the latest announcements, the 3730, IBM says can work as a "stand-alone word processor", whereas what they mean is "shared logic word processor".

What the rest of the world calls a minicomputer, IBM calls — what does it call? On looking through the bumph, I get the feeling it avoids the issue, like upper-class English people with no name for the last course of a meal.

I would be the last to claim to understand what goes on inside Big Blue's vast inscrutable corporate mentality, but I suspect it has something to do with the use of language to conceal thought, a devious practice with a long and distinguished pedigree.

Unilluminating addresses

I AM told that self-purpose recognition equipment is still a long way from being practical, if it ever will be, but I suspect some people in the States are forging ahead with using it, following the principle of Admiral Farragut who said, "Damn the torpedoes. Full steam ahead!"

Recently RTE, the Irish television service, received from the US a book addressed to "Rev Slyberry". Nobody in the Religious Department had ever heard of such a clergyman. There was much puzzling over this, until someone rang up the Reference Library and asked if they knew anything of the reverend gentleman, and then the penny dropped with an almighty clang!

Of course, it may not have been a machine that did this at all, but a slow-witted secretary on the end of a dictaphone. Human beings make mistakes too, you know.

It would be hard to beat the circular received by the office of the Better Business Bureau in St. Midwest American town. It was addressed to "Ms Betty B. Bureau".

Getting in on the act

THE Family Planning Clinic in Sandwell, Cheshire, is apparently acquiring a Mickie, the patient interviewing system devised at the National Physical Laboratory. The Sandwell Evening Mail, attempting to explain this, informs its readers: "The typewriter-sized computer acts as a visual aid for patients with sexual problems."

Wow! Talk about multi-function hardware. I know Chris Evans at the NPL has a reputation for unconventional, but I didn't know his machines actually demonstrated this sort of thing!

The "convergence of technologies" is a phrase which buzzes close to any discussion on information technology; and it is a phrase that could carry a nasty sting in its tail for any DP manager who fails to heed its message.

DP managers who regard the moves towards corporate integrated information services as an intellectual exercise in hypothetical speculation could be facing a nasty day of reckoning as they become boxed into a career path that has nowhere to go. Ron Yearsley, a director of BIS Applied

Systema, has had considerable experience in observing at close quarters the impact on DP management careers of the convergence of DP, telecommunications and micro technologies. In this interview with Malcolm Peltz, Yearsley warns DP managers that they should take stock of their future quickly and initiate positive and urgent steps to ensure that they use the changes introduced by information technology to enhance their status rather than being overtaken by the office manager or administrator in the race to the top of the information management tree.



Are DPMs going the way of the dinosaur?

LIKE the dinosaur falling to keep up with evolution, DP managers could face extinction unless they take the initiative in establishing themselves as a controlling influence in the changing field of corporate information.

That is the analogy Ron Yearsley, a director of BIS Applied Systema, uses to encapsulate the challenge being posed to the DPM by the convergence of information technologies into an integrated information service that will encompass the areas currently the concern of separate departments and managers — office services, the mail room, telecommunications and the traditional DP department.

"Dinosaurs grew to be very big but they developed some communications problems between their brains and their tails," Yearsley said, drawing a comparison with large DP departments which are becoming out of touch with what is happening around the fringe of their area control.

"So when sabre tooth tigers started biting their victims' tails, it took a long time for the message to reach the dinosaur's brain and for the beast to react." "Failure to adapt to a new environment led to the extinction of the dinosaur and I would recommend Charles Darwin's Origin of the Species as a salutary text for any DP manager to read as a warning to what can happen to those who fail to change their old ways to meet new trends," stressed Yearsley.

The key challenge to the survival of the DP manager as a thriving species, according to Yearsley, lies in the question of who gets the function that will be created in many organisations of "controller of administration" or "information services controller".

This function will be far wider than the management services function which has been the

pinchpoint of the DP management ladder so far.

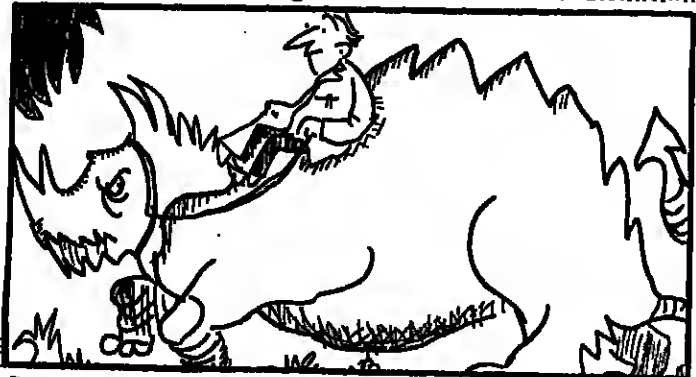
Yearsley said he had already been involved in one organisation which has established the position of administration controller with responsibility for DP, office administration and telecommunications.

"This top job did not go to the DP manager but someone with experience on the office and administration side. Yearsley believes that, unless DP managers

simile) services.

"When the senior executives in a company begin to realise that it needs a top man to co-ordinate and control all these services, the DP manager could be left behind, because he is viewed as too much of a technician who does not understand the wider problems of the organisation and the needs of the end users of the systems."

The DP manager has often got himself into this situation,



take the initiative soon, this kind of failure to progress in the company hierarchy will continue.

"I meet so many people in DP management with the attitude that they have reached the top and have done everything there was to be done in their own field," he commented. "They feel they've climbed Everest and seen it all before. Yet at the edges of their areas of direct control, revolutions are going on."

"The word processing market, for example, is growing like crazy and this companies marketing office systems are in there selling, selling, selling. And they are aiming their sales attack mainly at the office manager, not the DP manager."

Yearsley pointed out that there is a growing use of telephone switching systems, like the IBM 3750, which is bringing closer the integration of voice, data and picture (fac-

company management must be convinced that distributed processing can only work effectively if it is centrally planned and co-ordinated."

The DPM, Yearsley said, must become the progenitor of ideas. He must establish a relationship with the whole company, so that there is a feeling that the DP department is the place to go to receive advice and assistance on any aspect of information technology.

Yearsley mentioned the case of one DP manager working for a large group who one day found himself faced with a corporate decision that the DP department was to become a profit centre and that all the other operating divisions in the group had been given the freedom to choose whether they used his department or some outside DP service.

At first, Yearsley said, the DPM was worried because he realised he had to sell his services rather than sitting back and waiting for the compulsory users to roll in.

This gave him the impetus to get out and talk to users to find out what they wanted. And what they wanted initially was mini to call their own; something on which they could do their own local work.

He realised eventually that the user divisions did not really care what type of systems they had — the "mini" firms were only hooked on the latest buzz-phrase. So he made a deal with a manufacturer of small business systems to buy in bulk, thereby making a cost saving; he installed a small business system in each operating division while still keeping his own mainframe department going.

As a result of this, the DP manager was seen to be the friend of the user, because he was giving them the services they wanted, and he raised his status in the eyes of his own managers because he was seen to be an effective implementer of systems that added to the effectiveness of the corporate operations.

"This is an example of the best in DP management, with the DP department acting as the agent for change."

Given the problems of rapid technological change — increasingly demanding users, the lack of skilled staff, etc — what advice would Yearsley give DP manager who has seen "the writing on the wall" and wishes to avoid the fate of the dinosaur and the dodo?

"Make sure you delegate properly," is his main advice. "Delegate the operations to the computer services manager and the development to the systems manager. Make time for yourself to talk to users, to look at new developments."

The DP manager is in danger of sitting back in a comfortable technical niche, while the tide of micros and word processors rises all around him.

On the other hand, the DP manager can carve out a career path full of power and glory and riches. But it will take courage and effort to do this and time is running out. The future has already begun.

Selling to the unions

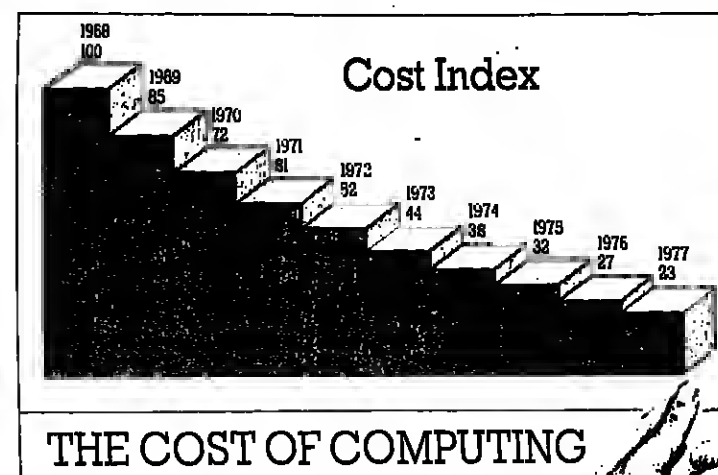
TRADE unions will play an increasingly important role in the running of DP departments and DP managers will have to become more skilled in employee and industrial relations, according to Ron Yearsley.

"Whether DP managers like it or not, more and more of their time is likely to be spent dealing with trade unions acting both for their own staff and for users' staff."

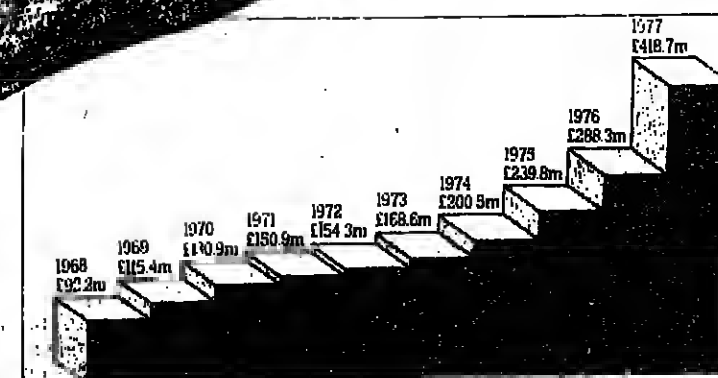
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GILB'S MYTHODOLOGY

Record level hash totals as a safety belt



THIS column introduces a fairly narrow idea, but then safety belts are narrow and they can still save lives.

The basic idea is simply that logical application records, such as those at the 01 Cobol level, must also contain a checksum which is usually a word of storage which is the binary sum of all other words in the record.

The checksum is recalculated whenever the record is updated and is available for re-checking at any time we want to verify the integrity of the record, in practice before any new update.

One of the few places I have seen this technique recently is in IBM's floppy disc control field specification. But it is absent from almost all texts on database and file design.

Even Gjo Wiederhold's book "Database Design" (McGraw Hill, 1977, 856 pp) does not mention it directly as far as I can see and only hints at a core buffer checksum.

The first time I saw it applied was in 1965 by IBM's software distribution centre in Paris, for the protection of records, which were operating systems in an 80 character format on tape.

After weeks of frustration in trying to generate operating systems from tapes which had

some sort of fault, one which was not detectable by parity checks, or any conventional check, IBM discovered that there was an 81st column on tape records and generated a record level hash total for each record.

When we got the tapes from Paris, we could immediately detect the presence of faulty records, and since we knew the exact record we could often get a Telex correction. Previously we only knew something was wrong and a new tape was dispatched from Paris.

This was dramatic in practice and from then on I became aware that there were a large number of file integrity situations which would benefit from the technique.

Certainly, today, I make it an early design specification in any file where reliability control is important and that covers almost all files.

Yet, to this day, neither IBM nor other manufacturers (please correct me if I'm wrong) teach this technique, or write about it, or even include it as an option in database management software, floppy discs excepted.

One reason why many people mentally discarded the technique was the cost of space and computation time for it, as opposed to their

reliability requirements. The economies have changed dramatically and the use of secondary storage space and CPU cycles to protect centralised online database records seems like a much better trade-off now.

When you recognise that the conventional re-reading of disc records can be dropped, when you use RLHT, there is even more immediate and tempting trade-off.

You cannot attempt immediate re-writes when you later detect an error but, on the other hand, you get error detection protection for the life of the record which is far more valuable than the simple verification that the record seems to be OK the instant it was written.

In particular you get protection from software errors, both in your programs and the supplier software. There are already thousands of known bugs in present systems in large operating systems in case you didn't know.

I can't go any deeper here but the idea is out in front of you. It is your responsibility to integrate this technique into your data protection design. It says so in IBM's software contracts and user manuals too.

I hope you will ask, as many of my students do: "Why didn't we learn about this long ago?"

Information Studies goes into Orbit

Information Studies thanks IBM for the timely announcement of Orbit and the Distributed Office Communications System.

Participants at "Communicating with IBM" on 7-8 November in London will hear the first European comments and assessment of these announcements, by Phil Dorn of New York, leading communications consultants David Hebditch and Fred Lamond, Saroj Kar of Telecom Computer Technology USA and Dale Kutnick, The Yankee Group, USA.



Brochure and further details from:

Information Studies Limited,
Regal House, Lower Road, Chorleywood,
Rickmansworth, Herts WD3 5LQ.
Tel: Chorleywood (09278) 4244.

PROGRAMMER NOTES

Micros challenge older techniques

TO anyone contemplating a change in career from working with mainframes to working with micros, the following notes may give more information on which to base a decision and, to anyone who has recently made the change, they may be instructive in providing a shortcut to acquiring the relevant skills.

The main area where it is likely that some education will be required are operating systems and their functions; and file access techniques.

Working on mainframes it is easy to forget how much the machine's operating system does for one, particularly when working in high level languages, which must surely be the highest probability for application programmers and analysts.

The kind of routines which may have to be developed include logical record input and output; memory initialisation; screen manipulations such as clears, roll-up, display in sections etc; data entry; buffering and unbuffering of packed data; print editing; and general error interception and recovery routines.

It is worth expending a lot of time to get these routines written efficiently, both in terms of operating speed and storage requirement, as the effort will be repaid in subsequent speed of application program development.

The second area which one tends to take for granted, working on mainframes, is file access techniques.

The three specific techniques worth studying are direct access, index sequential access and transaction chaining. If you are lucky, the micro you choose to work with will have some kind of index sequential access package, but even if it does it is quite likely that it will not be sufficient to cover all needs, and as far as the other two techniques mentioned are concerned you will probably have to work from first principles.

The lack of sophisticated operating system and file access aids has a major impact on system design, as it has the two other shortcomings of micros compared to mainframes. That is: low volume, backup storage and low speed printing. There follows a list of design parameters which are particularly applicable to micro-based systems, although some of them can equally be said to apply to mainframe systems.

Transaction files should be designed for multiple use, eg, the same file should be used to update the sales ledger, to print the sales day book, to update the nominal ledger and to update the sales history and statistics.

Simultaneous updating and printing should be avoided if at all possible. Spooling of printout is unlikely to be practicable, and

to have in re-run jobs from backup discs to get multiple copies of a report can be difficult and time-consuming.

Control techniques should be developed to bring to the attention of the user the fact that data files are reading capacity, while he still has the opportunity to deal with the problem within the normal system.

Queue of batch jobs should be kept to a minimum. Untrained operators, which is what

Most software people have been trained on mainframes and minis. The increasing use of the micro throws up new challenges to those schooled in the older techniques. Jack Schumann of Star Computer Centre provides some notes for the programmer about to embark on living with the micro.

most end users are, tend to be unconcerned about leaving the machine on its own for long periods, even switching off half-way through a run.

Reports should be concise and short, if they are produced automatically. Only those which users have specifically requested should include all the data which it is possible to provide.

Strict standards should be developed for screen layouts and particularly data-entry positions. Ease of use must be the major consideration, and this tends in practice to mean ease of data entry.

System errors should be in-

tercepted and made clear to the user. This not only allows the user to overcome the problem in many instances, but also makes life easier for the backup team in more serious cases.

Security backups should be an integral part of the system, otherwise recovery can become impossible, or at least extremely lengthy.

Modular techniques should be used whenever possible so that the same piece of coding, modified if necessary, can be used many times and not re-coded. This saves not only main memory space but object code space on the limited backup storage medium.

A library of standard macros should be developed and used whenever possible, unless a program has a high data-entry content, in which case speed of operation overrides speed of program development and own coding should be considered.

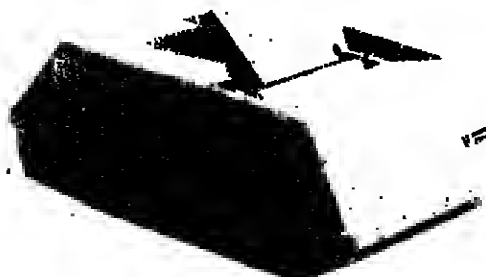
The sequence of operations in programs which have to be re-usable is highly critical. That is: control counts of records read and written, and position of input record last updated should be all updated at the end of the sequence of operations, simultaneously if possible.

If program overlays are necessary they should be executed when there is a natural break in the sequence of input.

In summary it is true to say that the difference between mainframes and micros is one of width of technique. One tends to have to do more to achieve the same result, but to have to do it efficiently to avoid using up the capacity of the machine or the patience of the user.

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Puzzler

MOST people know that three weighings on a two-pan balance will suffice to identify one faulty coin in a batch of 12, the maximum possible number given that the odd-coin-out is either lighter or heavier than the others.

Now, if the faulty coin is known to be lighter, then naturally a greater number of coins can be catered for in the analysis. This week's problem is to find just how large the batch can be in this case, and to formulate a suitable method for identification.

See page 53 for solution.

SOFTWARE FILE

Structured programming is being increasingly used by the more progressive programming shops, but too many systems designers still rely largely on traditional rules of thumb.

As a contribution to increasing awareness of the needs to improve system design technique, Computer Weekly is starting next week a 10-part tutorial series on structured file and database design written by Max Stewart, divisional technical support manager of Loyland's Scottish central region. Stewart installed the

operating software for one of the UK's first IBM 3802 SNA distributed database systems. In the series, Stewart will explain the underlying concepts of one of the most significant developments in database design, the relational database.

As a preview to the series and to place the significance of relational databases in terms of the real world of IBM marketing and product announcements, this week Stewart takes a peek into the future and predicts the likely impact of relational database systems on IBM's hardware and software in the 80s.

How IBM database systems might look in the 1980s

"FORWARD into the 70s with IBM's virtual storage systems". This, as many readers will remember, was the general tenor of IBM's publicity when OS/VS and DOS/VS were announced in a blaze of sentimental glory. Accepting the limitations of 1960s-vintage hardware, "human wave" programming teams (large and beautiful in those days) and a truly archaic job control language, they didn't turn out to be too bad after all. But IBM did not invent virtual storage; and our story could be repeated for many of IBM's less significant announcements.

The purpose behind this "dig" at IBM is to reinforce one point: it was not first off the line but ended up leading the market place by sheer bulk and muscle. But what of the consequences if IBM had been first in some major development?

We will shortly find out only too easily: the invention of relational database systems is arguably the most significant development this decade and IBM could with considerable justification claim a proprietary right to the concept.

The future of non-experimental relational database systems thus rests largely on IBM's hip and it is not hard to predict to make some predictions based upon present trends in IBM hardware and software development.

IBM will not produce a CodeSys sub-structure database management system.

IBM will introduce a file handling (high end) functional processor within the next eighteen months. This processor will handle all IBM file structures (possibly emulating a 3350 series disc controller) but will have a native mode for handling Vsm files.

This native mode will allow some Vsm functions - index searching for example - to be off-loaded from the main processor.

There is a strong similarity with the way 370X TP controllers work: Vsm resides in the main processor; NCP resides in the 370X and takes on some of the work which an older nucleus method such as Rsm performs in the main processor.

The back-end processor will have a large capacity bubble memory cache to reduce the access time for clustered retrievals; this again has a parallel in the dynamic address translation look-aside buffer of the current series of main processors.

Input/output channels will become microcode-driven sub-processors in their own right. They will be controlled in groups of six by a "functional processor" development of the existing 3030-series channel director.

This new intelligence will give channels a feature which has been sorely lacking - two-way working - analogous to running a communications link of full instead of half duplex.

For the H series of processors due within two years, the MVS operating system will be extended to support IBM's System S relational database management system and its access language Sequel.

Many System S functions will be performed in the file processor

and the Vsm index-searching mechanism will be extended to support generalised searching on content. The work involved in answering a query such as "RETRIEVE ALL EMPLOYEE NUMBERS WHERE (AGE > 65 AND SEX = MALE) OR (AGE < 65 AND SEX = FEMALE) AND LONG-SERVICE = YES" will be performed mainly in the file processor by searching the data content of records rather than by searching indexes.

System R will be offered with an IMS building aid similar to the team interface provided by Vsm but with extensive microcode assist. IMS users will thus be able to access a subset of a System R database. System R will also allow a System R (ie non-IMS) user program to access an IMS Vsm database. System R "implys" will be accessed as IMS segments and vice versa. IMS itself will continue to be supported.

Although System R is essentially interactive and terminal based, it will provide a lower level access method to user programs similar to the ACR/RPL mechanism used by Vsm and Vsm Programs will be able to execute some System R commands in their high-level form using an SVC or Diagnose interface similar to that available in VM/CMS programs.

The difference between files and databases will become blurred. From the user's point of view data will be stored and accessed as simple unstructured files. Users will be able to build hierarchies or CodeSys structures of files at will since the System R structure is more general than either.

Data will be defined in a Data Dictionary and the object form of a definition (similar in principle to the object form of an IMS DDD) will be produced automatically. Assist microcode will subsequently be announced to interpret high-level language data definitions dynamically (at run time).

Let us finally make one prediction to what even the purists might object: the unit of information flowing about in an SNA communications network is to the user, a request-response unit (RU).

The unit of information in a relational ("fourth normal form") file is a record ("tuple"). It is thus possible that IBM will define an overlay database/data communications strategy with the RNC tuple and SNA RU as one and the same thing.

Analysing circular structures

SOFTWARE for civil engineering provided by bureau SIA has been augmented with Shells, a program for analysing circular structures.

The effects of wind, temperature, settling, earthquakes and such on chimneys, cooling towers, curved box girder bridges, and similar structures can be ascertained in general terms before more detailed studies are made.

SIA claims there are virtually no restrictions on the size of problem that can be run. The bureau operates a CDC Cyber 72 front-ending a CDC 8600.

Value on Dutch market

OPERATIONS software products developed by Value Computing are to be introduced on the Dutch market by its UK distributor RTZ Computer Services at an Amsterdam seminar on Value's Comput-A-Charge system. An enhancement to it will also be released.

Mystery surrounds DEC's Bliss-32 in UK

THE new Bliss-32 language for writing system software on the VAX minicomputer appears to be something of an unknown quantity, at least in the UK.

Digital Equipment Corp announced Bliss-32 for the VAX-11/780 32-bit minicomputer two weeks ago, along with several hardware enhancements (CW, October 5).

Bliss has been used by DEC for writing operating systems, compilers and handlers since the start of the decade. It has never been made available to customers in the UK before, although some US users have exerted sufficient pressure on the company to get access to it.

Now, however, it is formally available on the VAX and, in the US, it will be offered from January at a once-only licence fee of \$12,000. No UK price is available.

The language bears some similarity to Pascal, Coral and Algol, but is very specifically limited to writing system software, and DEC believes that

some OEMs may welcome it in the UK for writing things like RTL-2 compilers.

Few details of the language are yet available however and Arbat, the systems house which specialises in writing system and application software for banking and finance, while aware of the language, knew little about it.

DEC itself is firmly wedded to Bliss, despite some pressure from within the company to switch to the increasingly popular Bell Labs C language for writing system software.

Distillery contract

COMMERCIAL systems for a Honeywell Level 62 computer ordered by James Burrough Ltd are to be designed by Software Sciences. Management Information, financial, order processing, and stock recording systems are the first applications required by the company, which distils Beefeater Gin and Borzoi Vodka.

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OP SPOT

OPERATIONS staff are often remarkably loyal to the operating system they have been brought up on. If you don't believe me, assemble a group of staff with different career backgrounds (in terms of the software they have used) and get them to compare notes. You can be sure that each will promote the merits of his particular system.

The problem with such discussions about operating systems is that certain barriers exist; some are conceptual in nature, but in the main they relate to the jargon and terminology peculiar to each system. Bearing this in mind I would like to discuss IBM OS, which is widely used on that manufacturer's 360 series and worthy of consideration both in itself

and as a forerunner to the OS/VS operating systems. Now, what follows is intended primarily for those who have little or no knowledge of the system and so I must ask IBM OS operators to bear with me. Although the system supports TP networks and usually works in conjunction with a spooling system, I am going to consider it in isolation.

Trying to gain a wider knowledge of systems

THERE are two types of OS: multiprogramming with a fixed number of tasks (OS/MFT), and multiprogramming with a variable number of tasks (OS/MVT). With the former, main storage is divided into fixed partitions (each of which supports one job at a time), while the latter has INITIATORS which allocate main storage (and other system resources) in accordance with each particular job's requirements. In this discussion I shall refer to OS/MVT. Let's start on the assumption that the system has already been loaded and trace a single batch job through the system. Now, at all stages the system will display messages relating to the needs of the job by means of a routing system. In addition to this, the System

Management File will be used by the system to record data concerning the resources the job uses. The first step for the operator is to start a READER, a WRITER and an INITIATOR. These are all procedures which live on disc and may be loaded into main storage by means of the START command. Next he must feed the job into the card reader, and after this OS takes control of the job. Firstly, the READER procedure takes the job and places it on one of the input queues. It informs the master console operator of this by sending him the appropriate message. Next the INITIATOR allocates the system resources required by the job: the tape and disc drives and main storage, etc. Now, each time a tape or

disc volume is to be mounted, the operator in the area concerned will be sent a message by the system requesting that he carries out the function. At the end of the job, the INITIATOR will de-allocate resources, place any listings to be printed or punched on the output queues, and keep the system operator informed about this by sending him a series of messages. The WRITER will then take the output from the queues and transfer it to the appropriate printer. That's it in a nutshell. Any hardware or software errors would have been related to the system operator by means of the routing system. In future Op Spots I intend to examine certain parts of the system in relation to a "real" OS

environment (as opposed to the highly simplified one just described). These include: 1) The types of messages issued by the system. 2) The OS message routing system. 3) The SYS.LOGREC and SYS.DUMP data sets, or files, on which data related to hardware and software problems is recorded, respectively. 4) Certain commands in greater depth. 5) Main storage (often called "core") fragmentation. 6) The Houston Automatic Spooling Program (HASP). 7) Etc. I would like to hear the comments and views of operations staff with OS experience, and welcome any questions on the subject from operators of other systems.

How the operator communicates with IBM OS

THE following are commands which the operator uses in order to communicate with IBM OS. Each may be abbreviated to the letter shown in parentheses: START (S). This is used to start procedures. For example: S WTRJOB. MODIFY (M). This will alter the function of a procedure. For example, to specify the output classes served by a writer, the operator might enter: F 022,Class=123pgr. STOP (P). Often referred to as the PARK command (as in parking a car), this is used to stop procedures. Format: P OOE. DISPLAY (D). This enables the operator to know the state of many of the systems resources. For example, to find out which tape drives are available for use he might enter the following: D U,TAPE. MONITOR (MN). Dynamically displaying the system's live tasks and the number of jobs on the queues, are two of the applications for MONITOR. The latter is achieved by specifying: MNN. SWAP (G). The operator can transfer a tape or disc volume to an alternative device by means

of this command. For example, if one drive is unable to read a particular tape, SWAP might be used in order to find out if another unit is able to do so. Format: Q 140,141. VARY (V). Devices are placed in an online or offline state (in the former they may be allocated to jobs, or tasks, while in the latter they may not), by means of VARY. Example: V 140,Online. CANCEL (C). By means of this command, the operator can terminate a job at any stage of its processing, whether it be on the input or output queues; actually live and running, or being printed. Its format is as follows: C Jobname. MOUNT (M). Tape and disc drives are assigned to the appropriate media by MOUNT. Format: M 145,Vol=(SL,123456). UNLOAD (U). This has an effect opposite to that of the MOUNT command previously described. Format: U 145. SET (T). As shown in the following example, SET is used to specify such system parameters as the time and date: T Date = 78,250,Clock = 08,15,00. HOLD (H). Using this command, it is possible to defer the processing of a job by placing it on the HOLD queue. Format: H Jobname. RELEASE (A). Jobs are freed from the HOLD queue by this command. Format: A Jobname. RESET (R). The class and priority of jobs on the input and output queues may be altered by means of this command. Format: E Jobname,Class=p, Prrty=5. REPLY (R). Certain system messages require a reply to be typed by the operator. To that end, he uses this command. Format: R ID,Text. BROADCAST (B). Communication between staff at different work areas is the purpose of this command. For example, the operator at the master console might send the following message to those tending the printers: B 'MUR, Load paylips on printer 001'. LOG (L). The operator uses this command in order to record

messages on the systems hard-copy log. It might be put to good use in keeping everyone up to date regarding the systems hardware. For example: L 'Unit OOE under service at 16:00'. L 'Unit OOE back in use at 17:40'. SWITCH (I). The system Management File comprises two data sets, X and Y, which are used alternatively by the system to record data relating to its throughput and performance in general. SWITCH instructs the system to close the active data set (in response the system reminds the operator to get the data printed) and bring the other into play. Format: ISMF. WRITELOG (W). The system log comprises two files, X and Y, of which only one is written to at any particular time. This command causes the active one to be closed and dumped to the output queues, and brings the second into play. Format: W L. DEFINE (N). This applies only to OS/MFT, under which it is used to specify the size of, and job classes served by, each par-

tion. Normally, the operator will list the partitions and redefine them accordingly. Format: N List. HALT (Z). This causes the system to wind down, and must be followed by an IPL (load). Format: Z EOD.

By Bernard Allen

HINT OF THE WEEK

A few tips on the maintenance of media

LAST week in Op Spot, Deborah Palmer, an operator at the Worthing site of the Gateway Building Society, suggested the manner in which a small to medium-sized tape library might be organised. And this week, she puts forward some tips relating to the maintenance of the media with a view to reducing the number of read/write errors that occur. "The need to clean tapes and drives, regularly, is not stressed enough," says Deborah. She continues, "The labels used for volume identification sometimes cause problems; as one is removed from a tape it leaves a residue which will eventually find its way to the read/write heads of one or more tape drives." It is better to use small cards and attach them to the reels by means of sticky tape, suggests Deborah. She also points out that "tape drives should be cleaned at the beginning of each day and immediately before any large job is run." I might add that front panels of tape drives should be kept shut at all times so as to prevent the accumulation of dust inside the units. I.S. will be paid for any reader's item published in Op Spot.

Underlapping—carry it out with care

MUCH comment has been generated by an Op Spot hint of several weeks ago (CW, September 14), relating to the alignment of pre-printed stationery. Writes one operator, "When there is a paper change, place the first form of the new box under the last form of the old one. Your suggestion to overlap the paper would result in two half-completed forms." I would like to thank this person and plead guilty. I did in fact mean to write "underlap". Rod Small, chief operator at the Automobile Association's site in Basingstoke, Hants, says that he is aware that I meant underlap and, while he agrees with the tip in principle, stresses that great care must be used. In relation to print quality he says, "If this method is used, extra attention should be paid to the print of the last page or two of the old box of paper. From experience, problems sometimes arise with print clarity and phasing because of the increased thickness of the paper." Concerning the actual alignment of the paper, he continues, "Attention should also be paid to the last page of the old box to check the horizontal plane of the lines of print. The reason for this is that the paper has greater play from the time it leaves the bottom tractor and is pulled only by the top ones."

tion. Normally, the operator will list the partitions and redefine them accordingly. Format: N List. HALT (Z). This causes the system to wind down, and must be followed by an IPL (load). Format: Z EOD.

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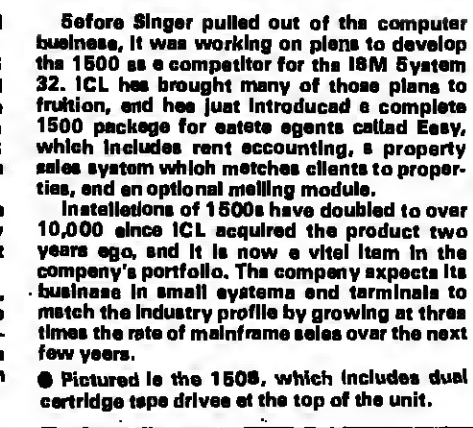
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ICL adds floppy disc storage to 1500 series

FLOPPY disc storage and desk top packaging for the large screen model have been announced by ICL for the 1500 series of transaction terminal systems. A new business-oriented Basic compiler has been introduced and, as forecast (CW, September 7), the Qume delay wheel printer has been added to the range offered with the 1500. The new 1020-character display desk top version of the 1500 is called the 1505, and effectively replaces the 1502 which offered similar features but had the electronics mounted in a desk pedestal. In addition to the Basic compiler and Cobol, introduced earlier this year, software to emulate the ICL 7181 interactive communications protocol for linking to large 2800s is available, and interactive IBM communication facilities will be ready shortly.

Before Singer pulled out of the computer business, it was working on plans to develop the 1500 as a computer for the IBM System 32. ICL has brought many of those plans to fruition, and has just introduced a complete 1500 package for estate agents called Easy, which includes rent accounting, a property sales system which matches clients to properties, and an optional mailing module. Installations of 1500s have doubled to over 10,000 since ICL acquired the product two years ago, and it is now a vital item in the company's portfolio. The company expects its business in small systems and terminals to match the industry profile by growing at three times the rate of mainframe sales over the next few years. Pictured is the 1505, which includes dual cartridge tape drives at the top of the unit.



Networking era arrives for Burroughs users

THE era of high level networking has arrived for Burroughs users. The mainframe company has finally announced its system software for those who wish to develop networks of interconnecting computers, under the name of Burroughs Network Architecture, BNA. Burroughs has placed heavy emphasis on flexibility. BNA allows any element in a network to communicate with any other, or to consult any database. Job tasks and files can be transferred from one host to another, and jobs can be shared between different hosts. Two new control concepts are introduced with BNA. The first, Host Services, assigns various new capabilities to each host in a network. These are the coordination of communications between tasks being executed on a number of hosts, the ability to access a database held on a different host, the ability to perform file handling tasks in connection with another host, and the ability to cause a processing task to be performed on a different host. The other new control concept, Network Services, controls communications between hosts by means of Burroughs Data Link Control bit-oriented procedures. It also permits Burroughs computers to be interfaced to X25 packet switching services. Burroughs systems can already be linked to non-Burroughs systems via the NDL and MS systems. As for programming, the existing Burroughs policy of keeping user application pro-

grams independent from the operating environment is preserved. BNA extensions have been added to existing supervisory software to enable existing programs written in Cobol, PL/I, Algol and Fortran to use the full resources of the network. Although BNA has been officially announced, the company is still vague about when it will become available, stating merely that this is "expected" to happen in 1979.

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And Burroughs says users can implement BNA capabilities at their own pace and "without affecting the basic structures of the user's existing application programs or data communications and network control programs". BNA is a software system requiring no special hardware. It is implemented at host level. Thus terminals communicate with other elements of the network via their own computer

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Banks study chain of terminals in shops

THE feasibility of establishing a chain of banking terminals in shops and stores throughout the country is to be examined by a project team established by the major banks and credit card companies. The decision follows a two-year study by a working party, which concluded that such a system is possible. The proposal being examined is that the shopper, when making a purchase, should be able to use a terminal to settle his bill, the amount being charged to his or her bank or credit card account. The same terminal would be used for all banks, rather than one terminal for each bank in each shop. The terminals would be operated by a plastic card, used in conjunction with a security

number which would identify the card holder. Each transaction would be checked by the bank before payment was made to the shop. The banks are still cautious about taking this step. The project team will study the social implications as a priority, as well as working out the technical details, and a decision to go ahead will not be taken until well into the 1980s. The banks and credit card companies involved in the project team are Barclays, Lloyds, Midland, National Westminster, Williams & Glyn's, Bank of Scotland, Royal Bank of Scotland, Clydesdale, Co-operative, Central Trustee Savings Bank, Bank of England, Access and Barclaycard.

NCR profits up 68%

THIRD quarter turnover and profit figures from IBM, Control Data and NCR all show big increases over the same period in 1977. NCR was the star performer, with a 68% profit rise on continuing operations. At IBM, an 18.2% increase in net profit to \$516 million shows a dramatic improvement over the figures reported for the first and second quarters, which were only 2.8 and 5% better than the same periods in 1977. Turnover rose 15% to \$5,280 million, with advancing deliveries of the 3030 series mainframes being credited for much of the improvement. Continuing a steady recovery trend at Control Data, profits rose 32% to \$24.1 million overall, but the company's computer business fell, with the division's profit falling 85% to \$11.4 million, on turnover up 28% to \$479 million. At NCR, profit from continuing operations—that is, excluding the Appleton Papers division, sold earlier in the year—rose 68% to \$16.9 million on turnover up 15% to \$638.4 million.

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CONFERENCE

The use of Computers in the Oil & Gas Industry

Promoted by THE OILMAN

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Dec. 7 & 8, 1978

Café Royal, 68 Regent Street, London W1

Chairman: Robert Lewis Ridings, Petroleum Engineer & Consultant

Day One Thursday, December 7	Day Two Friday, December 8
08.45 Delegate registration	08.45 Delegate registration
09.30 Opening address	09.45 Computers and economics
09.45 Use of computers in exploration	10.30 Use of computers for stock control and preventative maintenance
Kindel P. McNeill, J. Sefel & Associates	11.15 Coffee
10.15 Offshore structural modelling simplified through interactive graphics	11.30 Use of computers for personnel logistics security
Peter Kite, BOC	Roland Ball, Rockall Data Systems Ltd.
10.45 Coffee	12.15 Lunch
11.00 Use of computers in production engineering, R. Schofield, BNOG	14.00 Use of computers in platform design and construction
K. S. Doherty, Global Technical Services Ltd.	Dr K. A. Pike, Compeda Ltd.
J. M. Stacey, Chemshare Process Systems Ltd.	14.45 Use of computers in platform operation and control
12.30 Lunch	15.00 Tea
14.00 Use of computers for drilling	15.15 Computer aids for reservoir models
Larry Flournoy, Drill-Tech Ltd.	Dr David Wilson, Imperial College
14.45 Computers for planning from exploration to field-out	London University
15.00 Tea	16.00 Conference ends
15.15 Computer aids for reservoir models	Approx.
Dr David Wilson, Imperial College	
London University	
16.00 Conference ends	
Approx.	

Delegates' fees include full report of the Conference proceedings, morning coffee, lunch and afternoon tea on each day booked. There will be no papers distributed in advance.

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The Use of Computers in the Oil & Gas Industry

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PEOPLE AND EVENTS

Edited by Nancy Pocock

An MD for military micros

A MANAGING director has been appointed at Systems Production Ltd, part of the Systems Design International group. He is Alan Wheeler, who is a director of Systems Design Ltd.

Wheeler has been involved with military aerospace systems for over 20 years and his first contact with computers came via work on Blue Streak and Lineman for Marconi. He was also seconded for a year to the Nage consortium formed to set up an off defence system, where his function was the procurement of digital systems from the members.

He joined SDI in 1973 as a senior consultant on air traffic control and defence systems and in 1976 was made a director responsible for all project work.

Group chairman Philip Swinestead has been acting as MD of SDI since its formation in 1977. It was formed to provide micro-based products and systems using SDI's experience in the specification and procurement of hardware, particularly for military applications.

There are also plans for SDI to enter the field of the development of



Wheeler

ruggedised industrial systems and here again, experience with military systems for use in hazardous situations will be utilised.

David Marwood, company secretary of SDI, has been appointed a director of International Computers Ltd, its main operating subsidiary.

Multiple appointments made at Quadrant Software

THE manager of the Sheffield office of Quadrant Software, Les Abbott, has been appointed to the board. Jeff Spencer, sales executive, has become technical manager of the Sheffield office.

Two sales executives have been appointed at Quadrant Software. They are Peter Smith, previously managing consultant of Quadrant Recruitment, a Manchester office, and David Swann, who was a consultant in the company's Sheffield office.

From CAP Northern, where he was a sales executive, George Gunn joins Quadrant's Manchester office in the same capacity.

John Kelly has become technical resources manager of Computer People Contracts, a VLI Group company. His last job was as DP operations research team leader on a project in Zambia for Roan Consolidated Mines.

Also in the VLI Group are Software Implementation Ltd, where Mike Anderson has become a second marketing manager, and Computer People Contracts, where Tony Antoniadou, formerly a sales executive, has become sales manager for the South-East and several national accounts.

Fred Spendlove of Cara Data Processing in Dublin has been promoted from senior customer engineer to head of engineering service, computer products division, Albert Devlin, previously a senior customer engineer with NCR, has joined Cara in the same capacity and will operate in the West of Ireland.

Recently appointed customer engineers with Cara are Bill Fogarty, previously an engineer with the Irish Department of Posts and Telegraphs, and Martin Gleeson, who joins as a trainee.

Obituary

Arthur Stapleton

THE death has occurred of Arthur Stapleton, founder of Advance Electronics Ltd. He retired in 1969 but it was his company's success in the area of constant-voltage transformers and signal generators that prompted a successful move by Gould Inc, which acquired it in 1974, into the related fields of power supplies and test instrumentation.

ICL gives you dreams for lunch

A LUNCHTIME theatre in Fulham is being sponsored by ICL, whose corporate headquarters is just around the corner. Opening at the King's Head, Fulham High Street, on October 25 for a two-week run is a new musical revue called *Mid-Day Dreams*, a co-production by the Head Theatre Club and Amazon Theatre Co-operative.

Mid-Day Dreams is described as "a light-hearted look at the dreams and fantasies which often overtake our minds during the working day, whether in the office, the street, or at home". It was written by Chris Whittingham and David Seabrook, who also provide the instrumental accompaniment.

Performances will be on Wednesdays to Saturdays at 1.10 pm and Sundays at 1.00, for two weeks. Pub food will be available.

Tom Torpe has joined the Logobax OEM division as South of England sales manager for nitrax printers and terminals from Trend Communications, where he was an area sales manager.

Bryan James, previously South Wales zone sales manager with Burroughs, and Peter Wilson, previously an accounts manager with Burroughs, have moved to Redifon Computers as account managers for the South-West branch.

Joan Almsworth has joined OGC Computer Personnel as a senior recruitment consultant. Previously she was with Force 8 Computer Services in the same capacity.

Tom Garter, managing director of the Kallunna Group, has been appointed chairman of the recently formed subsidiary Kallunna Finance, and group secretary Geoffrey Brailwhite has been made a director and chief executive of the new company.

OR award to Pactel man

A SENIOR consultant from Pactel, Adrian Williams, has won the Operational Research Society's first Prospect Award.

Williams' work for Pactel on a tanker production scheduling model for a British shipyard won him the award, which is to be presented annually to a member of the Society for a project which has helped to promote OR in the eyes of user management.

Worth £500, the award is sponsored by Prospect OR Recruitment of Hitchin, Herts.

Tom Womulwak has joined CMC as regional director, government, from Redifon Computers where he held a similar position.

Alan Segley has joined Scope Data Systems as an analyst/programmer for CompuLink and 5800 systems. Kellie Pringle has joined Scope Data as a systems analyst in the control manager with the accounts department, having formerly worked for builders merchants W.M. Monks in the financial department, and Stan Hargreaves, previously a sales executive with RCR, Mohawk and Olivetti has been appointed South-East area sales manager with Scope.

CONFERENCES

A CONFERENCE entitled A Practical Approach to Installing Computers for Purchasing and Supply will take place on November 7 at the Excelsior Hotel, Heathrow Airport, London. It has been organised by the computer specialist section of the Institute of Purchasing and Supply. Applications, preferably before October 24, or telephone reservations can be made with the Institute at IPS House, High Street, Ascot, Berks, SL5 7HG. Tel. Ascot (0900) 23711.

Calls for papers

PAPERS are invited for a conference on recent and possible future developments in the design and performance of RHV switching equipment, to be held on November 28-29, 1978. The conference is being organised by the power division of the Institution of Electrical Engineers in association with the Institution of Electronics Engineers and the Institution of Mechanical Engineers and its Applications. Sympoia should be received before December 1 by the Organising Committee, IEE Conference Dept, Savoy Place, London WC2R 0BL.

A CALL for papers for the Fourth Conference on Software Engineering has been issued by its sponsors, the IEE Computer Society and Gesellschaft für Informatik. The conference is scheduled for September 17-19 and will be held in Munich. Five copies of papers, which should be 2,000 to 6,000 words long, counting figures as 300 words, are due by February 1, 1979, and should be sent to the program chairman, Prof. M. M. Lohman, Imperial College - UCL, 180 Queen's Gate, London SW7 2BZ. Tel. 01-598 5111.

THE University of East Anglia is organising a conference on constitutional updating, which is to be held at the University on July 9-12, 1979. Papers of up to 2,000 words, in a form suitable for publication, should be received by April 2, by Dr V. J. Raywood-Smith, School of Computing Studies, University of East Anglia, Norwich NR4 7TJ.

DIARY

OCTOBER 23 Can project management of automation systems be improved? Colloquium, Institution of Electrical Engineers, Savoy Place, London WC2R 0BL.

OCTOBER 24 Software management conference, American Institute of Aeronautics and Astronautics/Royal Aeronautical Society/Technical Marketing Society of America, Royal Lancaster Hotel, London W1, 0244 4043.

OCTOBER 25 Mini and micro forum, Ballin, Brighton.

OCTOBER 26 Computers, an aid or an impediment to creativity, Mike Cooley, BCS 1978 Lecture Series, London School of Economics, London WC2R 0AE.

Meeting, The microcircuit takeover - a new challenge for management? IEE's Microprocessor, Application Group, Savoy Place, London WC2R 0BL. Further information: Telephone 240 1871 ext 230.

OCTOBER 28 Student evening, BCS Edinburgh branch, Merchiston, Edinburgh. Ticket only. Details Peter Barker, 031 555 8456, ext 113.

Plato, N. Spoonley, BCS Teesside branch, Teesside Polytechnic, Middlesbrough, 19.00.

Real time subtitling of television programmes, L. A. Thomas, BCS Leicester branch, Leicester Polytechnic, 19.00.

An integrated OMS/ODS, Trevor Bakker, Geoff Barker, BCS Database Group, New Engineering Block, University College, London WC1E 6BT.

OCTOBER 29 One day seminar 'Getting into computing' - for the distributive trade CDA and BCC, Manchester. Further details, George Kinnear, 061-275 8331.

Demonstration by various manufacturers of recent equipment, BCS N. Wiltshire branch, Strivenham, 20.00.

OCTOBER 29 Operations group meeting, IBM Computers Users' Association, Newcastle Centre Hotel, Newcastle-upon-Tyne, 19.00.

OCTOBER 29 NOVEMBER 2 Electronics for and seminar, Association of Electronics Manufacturers in Denmark, Bells Centre, Copenhagen.

OCTOBER 30 Computers in television, Terry Smith, BCS Cheltenham & Glos branch, Queens Hotel, Cheltenham, 19.00.

X-ray computed tomography, E. Horn, IEE, Savoy Place, London WC2R 0BL.

NOVEMBER 1 ICL CMC Users' Association (CUMAC), Wigan, 19.00. Tel. 0562 25523.

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White House calls for DP shake-up

From Cameron Davis in Washington

"UNLESS something is done soon to improve significantly the way information technology is being used in the federal government, the general wellbeing of the United States will be seriously jeopardised." That was the basic conclusion reached by President Carter's Reorganisation Project on Federal Data Processing. A "discussion draft" of the DP reorganisation team's final summary report, which will be forwarded for President Carter's consideration, was circulated last month among the 10 task forces that contributed to the project. Revisions to the first draft will be made this month and the final report is expected to be completed by October 31.

The first section of the draft document, called "Advocacy for Information Technology," recommends that the Office of Management and Budget should develop, by November 30, a Presidential Reorganisation Plan which would create a special assistant of the President for information and technology policy, plans and programmes; an executive associate director for information resource management policy within OMB; an information resource manager in each department or agency of the government; and a National Council for Information Technology Policy, Plans and Programmes.

The document suggests that the Presidential assistant for ITP serve as the "senior advocate for information technology within the Administration."

Within the same section of the report, it states, "Computer communications and information are becoming closely interrelated. Consequently, it is argued that the question of policy, which relates to them, be addressed together."

"The rapid changes in computing and communications" create phenomenal opportunities to use technology to reverse the decline of government information programmes to measure their cost-effectiveness and performance; to gain control of government financial operations; and to implement innovative solutions to problems," the report states.

"There is an urgent need to exploit and accelerate the development of [information] technology," the report concludes.

The CBEMA executive told President Carter that foreign trade should be viewed as an important component of the country's national welfare, and not as a tool in political warfare. Export decisions should not be based on "such ethereal concepts as universal human rights," Honigswald said.

"The US share of world exports has steadily declined from 16.5% in 1960 to 15.4% in 1977, and continues to decline," the CBEMA letter stated.

It also noted that America's role as the world's leading exporter of high technology goods and services is being threatened by other industrialised nations, citing Germany and Japan in particular.

A SIMILAR in Brussels on performance evaluation of computer systems has been organised by IAT, the ITP Applied Information Processing group, and will be held on November 22-24. It will be conducted by Prof. H. J. van der Velden, from the department of Informatics of the University of Leiden, The Netherlands. Further information from IAT Headquarters, 30 Paulusstraat 1071 HB Amsterdam, tel. 020-625-75351.

CORAL NEWS which, in Computer Weekly, October 12, 1978, incorrectly carried the text from the first CORAL NEWS of January 12, 1978.

The correct text will appear October 26, 1978.

Programming group meeting, IBM Computer Users' Association, De Vere Hotel, Coventry.

NOVEMBER 2-3 Programming group meeting, IBM Computer Users' Association, De Vere Hotel, Coventry.

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PDP-11/34 for Dulwich College

A MAJOR step in an already ambitious programme of computer education has been taken by Dulwich College, South-east London, in acquiring a complete PDP-11/34 system for its own use. Eight terminals, a mixture of DECware and VDUs, have been installed, with two disc drives, a line printer, and a magnetic tape unit.

Dulwich has had a computing centre since 1969, up to now using terminals to an outside bureau. The computer is also being used for a considerable amount of school administration.

The machine is running under RSTS/E, allowing pupils to program in Fortran, Basic and Assembler. The computer is also being used for a considerable amount of school administration.

School timetable planning software

FURTHER software for school timetable planning is available from Oxford Systems Associates (CW, Feb 9). This is the Oxford Course Planning Aid, which is designed specifically to help

with the problem of option grouping. In its standard version it allows an unlimited number of students to select up to seven subjects each from a choice of 54.

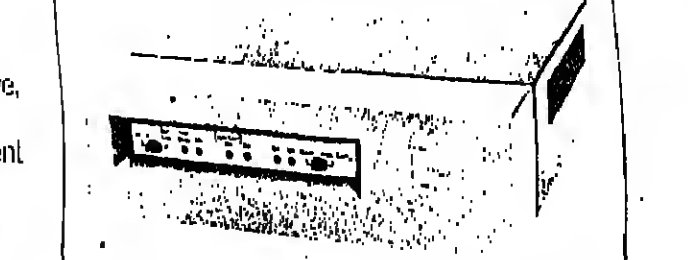
OXCPA, as it is called, is written in Basic and will run on a microcomputer with 32K of memory. The program costs £95 in the standard version.

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IBM split 'bid to get off anti-trust hook'

THE split of IBM's DP development and manufacturing division into two units is the first step in a plan by the company to circumvent US anti-trust threats by dividing the company into a number of autonomous, nonaffiliated subsidiaries. That is the view of Charles Licht, president and founder of Advanced Computing Techniques, the New York research and services company.

It appears that those who own 85% or less of a subsidiary cannot be accused of monopolistic practices, and Licht believes that IBM Corp is about to turn this rule to its advantage in getting off the anti-trust hook.

Licht postulates a probable seven autonomous subsidiaries, each owned 85% by IBM Corp while the remaining 15% of equity in each is sold off to outsiders.

There would be two foreign marketing subsidiaries, one for Europe, the Middle East and Africa, and the other for the Far East and each would continue to market the full range of products. There would be a US marketing company for DP products, while the General Systems Division would become a subsidiary.

In addition there would be three subsidiaries which "did no marketing to the end user. The three would be the new Date Systems Division developing and making H-series mainframe systems products for the E-series, and one for peripherals."

Licht also believes that these three development and manufacturing divisions might also begin to sell hardware OEM to other manufacturers and system builders.

Students want research into micro impact

THE National Union of Students has added its voice to those calling for more government-funded research into the social effects of microprocessor technology.

The union has sent letters urging this to Education Secretary Shirley Williams, Employment Secretary Albert Booth, and the chairman of the Science and Social Science Research Councils.

"We are seriously concerned about the job prospects of our members," said David Aaronovitch, NUS national secretary. "Unless further higher education courses are geared to technological change, the long-term career prospects of many students could be jeopardised."

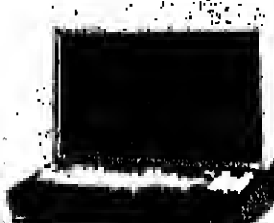
"We want the people of Britain to control the development of microtechnology and not large corporations like Philips or GEC," added Aaronovitch.



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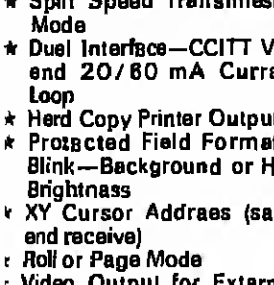


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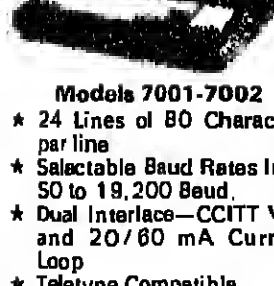
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by Don



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LEASED LINES

What with the excitement of setting up the new offices in St. James's and buying 3 megabyte 370/150 from an Italian bank, J.R. has gone power-crazy. Now he wants to set up a computer dial-up service so that we can have instant access to clients' needs and exchanges. I suggested a blackboard and chalk and a kind of hush look came over his face when that of a religious zealot. I suppose we shall do it soon and will let you all know.

M.R.D. bought and sold some Model 8 IBM tape drives last Thursday and this is developing into a good line for us.

370/148s are a very good buy at the moment and we can offer a selection for you. The base price is 80% of IBM's now price. This means we can lease a 1 megabyte 148 to you for the astonishingly low price of £7,999 per month over four years. You can buy, lease or take a conditional sale with, or without Government capital allowances. So, if you can't wait for the new "E" series, give us a ring.

J.R. has for sale some 3420 Model 8 tape drives and 3800 disk drives for sale. M.R.D. wants to buy 3360 disk drives. May I tell you just what to sell, that 370/150 to pay the rent.

Will write again next month.

M.P.H.

COMPUTER CAPITAL
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TELEPHONE 01-574 0361, 12124 0361

Some of the best activities of the British Computer Society are initiated by the BCS specialist groups. These groups are organising a conference in London from January 4 to 6 called

BCS 79, Living with Computing. In this series of articles, the work of the specialist groups and their BCS 79 plans are described. This week the focus is on word processing and its implications.

WORD processing has been described as the application of electronics to the typing process, by which is meant the complete activity from the capture of text, through its manipulation to its distribution and printing. It thus embraces text preparation on terminals, consisting of keyboards, with or without VDUs and with or without hard copy devices, and its dissemination over telecommunications links or through the mail to other similar devices or to the final recipient in an appropriate number of copies.

This is an area where many changes are taking place as a result of the introduction of modern technology. Replacement of typewriters by word processors extends the capability of typists to handle work, particularly repetitive work, and the retyping of drafts. Indeed, estimates for increased productivity range from 25% to 40%. This has clear implications regarding the reorganisation of office work, and may well lead to a significant loss of job opportunities, if not to actual unem-

Word Processing Specialist Group's role



The author, Professor Sandy Douglas.

ployment, where up till now a continuing expansion in employment has taken place over many years.

Moreover, the possibility of linking word processors over telecommunications, and of extending their capacity to

handle files, is considerable. The linking of local systems can be done in such a way as to allow the preparation of a document on one machine and its reproduction subsequently on one or more remote machines, thus passing over the telecommunications link what might otherwise be produced as local hard copy and sent by mail.

Finally, the processes of reproduction in hard copy are undergoing change with the introduction of cheaper and more effective photooffsetting equipment, which is itself computer driven. There is an increasing tendency to carry out printing in-house rather than sending it out to printers, and to integrate this printing into a more general procedure for reproduction of documents using, for example, photo-

composers working off hard copy.

While it is not the primary role of the Group to explore all the social consequences of these significant trends, nevertheless it is impossible to discuss word processing without an awareness of them.

The Group naturally has as its primary interest the exchange of experience regarding hardware and software included in word processors and of know-how with regard to their choice and introduction. However, in the last year we visited not only several manufacturers but also the NPL to discuss the impact of schemes such as SCRAPBOOK and of their fast laser-driven output equipment. It is intended to continue to keep the manufacturers' offerings under review in the coming

year, while at the same time making visits to such related projects as Inspire, the IEE system for dissemination of technological information.

The presentations in January will reflect the range of interests of the Group, with a general discussion of equipment by Brian Parkinson and a talk on its application in Unilever by Alan Patterson, followed by more general discussion, which may well touch on some of the social issues mentioned above, since one of the panelists is Barry Sherman of ASTMS.

It is hoped that a number of exhibitors will be showing off the tricks that can be performed with word processors both during the more technical part of the conference and on the Saturday popular programme.

LETTERS

Leaving it to bosses invites chaos

YOUR correspondent I. Drummond (CW, October 5) asks whether the establishment and maintenance of professional standards in computing should not be left to employers instead of other bodies, because so many of those involved in computing are in employment rather than being self-employed.

I think the place of employment or whether one is self-employed have nothing to do with the matter. The fact that most engineers, for example, are employees does not lessen the need for standardising and professional bodies in engineering. To leave such functions to thousands of (competing) employers is to invite chaos, and anyway the employers' interests are not always the same, between themselves and vis-a-vis the public.

Where I am sure that Drummond and I agree is that employers have a vital role to play in the establishment of standards and their maintenance thereafter, and that it is in their interests to have staff who are fully trained.

PAUL SAMET
President

British Computer Society

Survey analysis packages

I WOULD like to correct certain information given in the article on Survey Analysis Packages (CW, September 28).

ASCOP, ICL Datskill has no direct connection with this package. Dr B. E. Cooper, the author of ASCOP, who now works for Datskill, may be able to answer some questions. We do not know from whom information should now be obtained.

DAS, Information from ICL Datskill/Local ICL office.

PACRAGE-X. Requests for information from UK government financial bodies should be addressed to CSO. Requests from other people should be addressed to ICL Datskill.

XDS2/3. Information from ICL Datskill/Local ICL office.

XDSF. Information from ICL Datskill/Local ICL office.

A. E. THOMAS
Manager, Data Analysis Unit
Advanced Systems Sector

ICL Datskill Ltd,
Reading Bridge House,
Reading RG1 8PN

The Editor welcomes letters on subjects published in Computer Weekly, or on original topics. All letters must be accompanied by the writer's name and address, not necessarily for publication. All letters are liable to be cut at the discretion of the Editor, unless correspondence states that their letters may not be cut.

Eighth UK plant

AN eighth UK plant is planned by Burrnoughs, ultimately offering employment to 200 people. The 100,000 square foot facility is to be built at Livingston New Town in Scotland and will become a centre for research, design and manufacture of high technology electronic products.

NEWS IN BRIEF

Europe debut for Cray 1A

THE first Cray 1A system in Europe is due to be delivered at the end of the month to the European Centre for Medium Range Weather Forecasts at Shinfield Park, Reading, Berks. The one Mword machine will take over from the Cray 1B, 500,000 word installation at the UKAEA Rutherford Laboratory at Chilton, Oxon, on which ECMWF programs have been developed. That machine will then be used by the Defence Ministry until the Cray 1A ordered for the Atomic Weapons Research Establishment at Aldermaston (CW, April 28), is delivered early next year.

'Relax rules' plea

LAUNCHING a campaign for relaxation of export rules for computers to the Eastern bloc, the US Computer and Business Manufacturers Association has gained backing from a study by the Brookings research institute which points out that the business generally grows in other Western countries, and even in the case of advanced military computer systems, the Soviet Union was capable of developing alternative solutions.

Micro version

A VERSION of Algol-68 designed to run on Z80-based microcomputers under the CP/M operating system is being made available by Research Machines. To complement it, versions will be available for the DEC PDP-7 and PDP-11 machines as well. The Z80 version, which will cost £99, requires a minimum of 20K bytes, while the PDP versions, costing £250, require 8K words minimum.

Wake up to micros

"A BLAST" to wake up people in education to the impact of microprocessors" is the intention of a conference being held on November 27 by Stockport Education Authority. The conference will be aimed at local industrialists as well as teachers and administrators, in order to deal with the way business may be affected by new methods of automation, and how this affects the training that young people need. Owing to limited accommodation, attendance will be by invitation only.

Yesterday's branch office



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Goonhilly to test speech squeezer

A WAY of squeezing a quart into a pint pot is how Cambridge Consultants describes the digital speech interpolation equipment it has developed for the Post Office, and which is now being installed at the Goonhilly ground station for working tests via Intelsat.

Using a complex distributed microprocessor approach based on seven Texas Instruments TMS9900, 16-bit chips, the equipment has been designed to double the capacity of time division multiple access, TDMA, links without adding to the system segment costs.

To achieve this task, the system works dynamically seizing and re-allocating channels during conversational pauses, so halving the number of channels required to handle a given pool of speech signals.

Included in the £200,000 development contract placed by the

Post Office was a requirement to build a speech activity simulator so that the system could be tested.

Based on two Intel SBC 80/10 microcomputer cards, this has to simulate the speech activity of up to 240 terrestrial channels. The simulation is based on stored statistical distributions of various parameters found in a typical conversational pool. To evaluate the interpolation equipment, one or more test channels are monitored continuously while the simulator loads the equipment with dummy traffic.

The basis of the DSI equipment's operation lies in providing accurately timed bursts of data within the TDMA time frame. The frame itself is 750 microseconds in duration, and consists of bursts of data transmitted to a satellite from all the ground stations within the satellite's area. Each burst is timed to arrive at the satellite at a pre-determined point within the time frame, and consists of data transmitted at a rate of 5125 Mbits per second.

This data is made up of a preamble, which gives such information as the transmitting

station's identification code, and up to eight sub-bursts from the DSI systems attached to the ground station.

The sub-burst contains the 120 satellite channels being transmitted together with an assignment message which, when received at the receiving ground station, gives instructions on the changes in routing of the satellite channels.

Changes in channels are made on the basis of voice activity on the channel, and the level of demand for channel access. When the demand from the 240 terrestrial channels exceeds the capacity of the 120 satellite channels, voice activity is monitored. Unused channels are then switched to another terrestrial channel. This process is repeated with every sub-burst.

Several other countries are testing similar systems, but the majority of these are based on single microcomputers controlling the whole operation of speech interpolation. By going to a distributed micro approach, Cambridge Consultants feels that the Post Office, though later in the field, may well have got a better deal.

National Semiconductor launches Codec chips

A QUITE entrant into the market for Codec chips has been National Semiconductor. Even though the devices were formally announced only last week, they have been in production since January, and are now available off the shelf at a price of \$20 per set at the 100-off level.

The two-chip system, designated TP3000, has been designed in collaboration with several major telecommunications equipment manufacturers, both in the US and Europe, and meets both US and CCITT specifications. The chips contain all the necessary elements for a complete single channel pulse code modulation Codec, providing both input and output sample and hold, non-linear digital converter, comparator, on-chip voltage reference, successive approximation logic, 1/2 buffers, auto-zero circuitry and the necessary control logic.

Two versions of the set are available: the TP3001, uses the u-law coding for analogue signals, and the TP3002, using A-law specifications.

National uses a CMOS process to implement the digital functions of the circuit, while the

analogue portion is executed in the company's BiFET process. These processes have been chosen primarily because the life cycle of the chips will have to be of the order of 20 to 40 years. Both processes have been in use long enough to acquire a long enough history of reliability.

The chips sample a filtered analogue signal at an 8kHz rate, converting it to an 8-bit digital code. This can be transmitted at any data rate between 64 and 2,100K bits per second.

The initial market seen for these chips is in local exchanges, according to Kurt Slem, National's director of telecommunications marketing. The ideal situation of having one Codec per handset he sees as being some way off. "There are engineering problems that go against using Codecs in telephone handsets," he said.

"In addition there is the cost factor. A handset currently costs about \$9 to produce, so even if a Codec set cost \$3, it is still not in."

Another important market for the devices is likely to be in office communications products.

Off-the-shelf DG stockist

THE availability of 10-bit microcomputers from the traditional minimakers is making new marketing methods essential, and Data General is pioneering the use of stockists who can offer off-the-shelf delivery of items like the MicroNova.

In the UK Data General has appointed Celdis of Reading, part of the £33 million Unitech group, to handle the MicroNova and associated integrated circuits, system software and peripherals.

Celdis already markets a wide range of semiconductor devices from companies like Motorola, Fairchild, Mostek and Nippon Electric, but the MicroNova is the first 16-bit device handled by the company. It has £750,000 of parts in stock and is investing £100,000 in Data General components, the largest being a 10 Megabyte disc drive.

This month, ICL celebrates its tenth birthday, although the history of the company is much older, because most of the pioneers in British commercial computing, like British Tabulating Machine, Power-Samae, Leo, Ferranti,

Elliott Automation and Mercon had contributed to forming ICT and English Electric Computers, the companies which merged in 1968 to form ICL.

In Computer Weekly's ICL birthday feature, Tim Palmer

interviews ICL's current managing director, Dr Chris Wilson, about ICL's achievements in its first ten years and his hopes for the future (this page). And on pages 16 and 17, Fred Lemond analyses ICL product strategy.

'No merit in coming second'—Chris Wilson



AHEAD OF THE FIELD...

"No one company can be ahead of the field right across the board, but we have to be ahead of the field in some areas — and I think we always have been."

"There is no one thing which you can identify in 2000 architecture as being outstanding now; you can talk about stacks, virtual memories and so forth, but the strength lies in the combination and in the fact that current techniques were designed in- rather than being added as afterthoughts."

From the day he took over as managing director of ICL 11 months ago, Dr Wilson has consistently stressed the importance of services in the continued growth of the company's business.

"This year, we have provided 30,000 man-weeks of training, nearly two thirds of it to non-ICL personnel," he said. "We have provided 1,000 man-weeks of training under the Manpower Services Commission's FOPS scheme; that breaks down into

30 people on 20-week systems analysis courses and 40 people on 10-week programmers' courses."

"Once we have trained them, we endeavour to place them, and I'm told that we have had 100% success in finding jobs for the people we have trained under the scheme."

"We are also planning to stage high technology seminars and we already have development seminars for two or three days for company directors, which attempt to demonstrate to them how they could use computing more effectively in their businesses."

"Most of our training is still done in the UK, but we have about 240 lecturers on our staff, operating in 30 countries."

Dr Wilson has already identified Continental Europe as a

major growth area for ICL services, and that includes training.

"We need bigger training centres in Europe, and we are making a heavy investment, but nowhere near the scale of what we are doing in the UK," he says.

"Overall, Datasilk is about doubling its turnover every two years, and the opportunities for setting up a Datasilk operation in each country are good. I believe it is quite possible to build up a software, systems, applications and perhaps turnkey contracts company from scratch, but bureaux are another matter."

"I think it would be difficult now to start bureaux from nothing, and acquisitions lead to trauma. In other parts of the world — Australia, New Zealand, Singapore, South Africa, Nigeria, Zambia — we have bureau operations."

"If the right opportunities for acquisitions occurred in Europe, we would consider them, but they are not part of our plan."

"It is estimated that, by 1981, the total European expenditure on all aspects of data processing will be £15,000 million, and the services element of that is enormous. The opportunity is there, and we can increase our share by development of our own staff and by Datasilk-type operations."

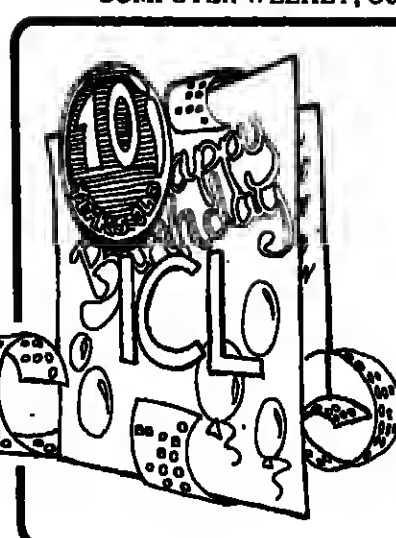
Like his predecessor Geoff Cross, Dr Wilson believes firmly that the single-tender policy for computer procurement by the government is vital, not only for ICL but for the whole UK computer industry and indeed the nation as a whole.

"He goes further. "I believe that the EEC should have a procurement policy, because I think it would be quite wrong for the only major supplier of computers in 10 or 20 years to be America or Japan."

"When the ruling governing computer procurement by EEC governments expires in 1980, I believe that the EEC should substitute a Community-wide policy similar to that of the UK government."

Dr Wilson diplomatically declines to say whether he regards the 83% French-owned CITI Honeywell Bull company as European in this context, but does he spell out the details of what he has in mind. But the clear implication is that ICL and other European manufacturers like Siemens should be given favoured access to government contracts in countries like Italy and Holland, as well as the UK and Germany.

Suggested here has been made by the National Enterprise Board has plans for ICL to be a major player in its own right, a greater British computer and office communications industry.



S. African problem

THE two biggest problem areas in ICL's worldwide empire today would appear to be South Africa and the US — the one for reasons of outstanding success, the other for comparative failure.

"I do not necessarily accept the statement that ICL is likely at some stage to have to withdraw from South Africa. Our job is to run the company as effectively and efficiently as we can, and South Africa is the same as anywhere else. We always operate under the laws of the countries where we do business, and under the law as laid down by the UK government."

"We have had a request from the South African government for licences to manufacture some of our products there, and we are considering the pros and cons of a licensing agreement with them."

"Our business is running at a cost of £50 million annually there. This makes the subsidiary a little bigger than ICL France, but not much. I am not aware of any African country threatening a boycott of our products because of our South African business,

and do not fear that we will lose business in Nigeria; the Nigerian trade with South Africa flows freely."

Turning to the United States, ICL's ambitions there seem to have become more modest over the past year.

"I do not see ICL in the ever expanding more than 2 to 3% of our total business, and I would be quite happy in five years' time to see it a small, profitable company doing about £30 million a year," says Dr Wilson.

"We found that we were spread too far in the US, and we have done some rationalisation; we are also reviewing our relationship with our dealers."

"We are selling 1800 and System Ten 220, and market the 2803 in a slowly widening area around New York."

"We need a recognised presence in the US to assist our credibility in the rest of the world, and eventually we shall introduce the large 2800s there in a controlled manner. Selling 2800 in partnership with a US company is not now being considered."

interference from them, and they are not represented on our board of directors."

"Government involvement in ICL was significant four or five years ago, and it caused problems in overseas marketing, because customers got the impression that we were a failing company propped up by the UK government. But that image is rapidly diminishing now."

There have been widespread suggestions among investment analysts that heavy investment in its rental base and in research and development will enable ICL to keep its profits below the 7.5% figure at which repayments of the £40 million development loan for New Range would have to begin.

Dr Wilson will only say that his responsibility is to run the company in the most effective manner for the benefit of the shareholders — which include the government through the NEB.

Among the possible developments that have been mooted are an amalgamation of ICL, Ferranti and the NEB's as yet unformed office equipment company into one company; and the sale of Plessey's 24.2% stake in ICL to Reach, beyond the fact that ICL shares are arguably a very sound investment. These seem to be no industrial logic in the latter suggestion from Reach's point of view. The company is an ICL customer, but unlike Plessey is not an ICL supplier.

Dr Wilson declines to discuss any of these issues, and only in the most oblique references in answer to questions about the process, control, business, and about the difficulty of handling acquisitions does he give any hint that he might prefer ICL to remain outside any structural

reorganisations of the industry. "I never get involved in discussions about bringing companies together," he says firmly. "I think it is very damaging to the companies involved to talk about it, and people who do constantly talk about it are often insecure about their own companies."

The major challenger to any computer manufacturer is, of course, IBM, and companies have tried two ways to emulate IBM in the computer business. One is to copy slavishly every product that IBM introduces in the hope of picking up crumbs from the giant's table. The other is to emulate the general business principles which have been a major factor in IBM's success — a policy particularly emphasised by that phenomenon of the German computer industry, Heinz Nixdorf. Dr Wilson's thinking clearly follows the same lines.

"The rental and service element of ICL's revenue is second only to that of IBM, and will continue to grow as a proportion of the whole; that is what the game will be all about in the future," he says.

"Software pricing has always been a part of our policy; we started to unbundle before IBM did."

"In the future, the added value will come increasingly from marketing activities; and the value of our maintenance and other services is growing as fast as the return on hardware."

"We do make predictions of what IBM will do in five years' time, and our plans are in place to deal with it. Five or six years ago we were completely out of our minds, and I think we are now more realistic."

Brotherhood of Software Developers

Turn to page 17

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THE
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TEN
YEARS

Bold gamble to win the 'information market' of the 80s

AT the time of the 1988 merger, the announced models of the 1900 Series and of System 4 paralleled each other all the way from the price-performance level of the IBM 380/20 to that of the 380/85. See Table 1.

The customer bases of the two series were much more complementary. The 1900 Series dominated the British and Commonwealth markets for small to medium sized systems, but the largest systems installed in any number of that time were the 1804E and 1905E, as well as the earlier 1808 and 1907 of roughly equivalent power. Deliveries of 1804F and 1905F systems were only just beginning, and those of the equally powered but more advanced 1804A were not due to begin until 1970.

As for the radically re-engineered 1800A, announced in September 1967, it was at that time little more than a paper tiger which had collected no more than a single letter of intent.

English Electric Computers customer base, on the other hand, lay mainly among a small number of large users, notably the Post Office. Deliveries of 4/70s had begun to replace earlier KDF 9 and LEO 328 systems, and orders for this top-of-the-range system were quite substantial. It was at entry level that the 4/30, whose design had been subcontracted to Marconi as part of an internal English Electric political battle, had been somewhat of a disaster story.

Since the Ministry of Technology's main reason for pushing the two surviving British mainframe manufacturers into a merger had been to eliminate wasteful duplication of development effort on identically powered products, ICL could thus have undertaken some immediate drastic pruning of its product line without upsetting any customers.

At the lower end it could and did pension off the 4/30 as fast as outstanding contractual commitments to Marconi permitted, and converted the small number of 4/30 users to 4/50 systems by 1971. This left the whole small system field clear for the successful 1800 Series.

At the top end, no one outside West Gorton would have missed the 1808A if ICL had then quietly withdrawn it. The enormous power of the 1804A gave ample top cover to the existing installed 1900 user base, and it seemed likely that processor design could in time be stretched further with later and faster components, as indeed it was in the 1904S announced in 1971.

Beyond that, the obvious growth path for medium size 1900 users and the more substantial number of 4/70 users lay to a large 32-bit word processor that would have implemented a superset of both the 1800 and System 4 order code.

Such a joint superset processor would not have been very difficult to design. For apart from their dissimilar data structures, 1800 and System 4 processor architectures were really quite close (Table 2). Both used a "one-and-a-half address" type of processor logic, in which one operand is fetched from an indexed main memory address, while the other is fetched from, and the result stored in, one of a small number of general purpose registers, some of which can also be used as index registers.

Within this common design philosophy, System 4 had the more complex architecture of

the two series, offering notably a larger number of registers of greater width, and a larger range of arithmetic operand types. It would thus have been easier to emulate the 1800 machine code on a System 4 processor than the other way around. The only instructions that would have to be added to System 4 300-compatible machine code were the 1900 indirect addressing facilities. In

the IBM 360, it was essential that ICL offer at least one equally homogenous computer family from bottom to top. These 1988 remarks acquire their full flavour when read in the context of ICL's current product range 10 years later (Table 3). Leaving aside the System Ten and 1500 series acquired from Slinger only two years ago, ICL's successor 2900 series offers an even greater diversity

2900 series is in fact a wholly new general purpose computer series, that is not upward compatible other than via conversion aids with either of ICL's two computer families of 1988. ICL is the only major mainframe manufacturer to have introduced such a new series in the last 10 years, and the only one to have imposed such an upheaval on the source program and data file libraries of its large-

were seen as the main large user requirement of the 1980s—large information systems, concerned far more with database inquiry, updating and manipulation, than with the calculation tasks of the traditional Von Neumann computer. It was in order to fulfil these tasks as efficiently as possible with the minimum of user programming effort, that ICL designed the 2900 series with its virtual machine concept, multi-level indirect virtual memory addressing, 4,000 Mbyte address range, and pushdown stack processing.

It was a bold and imaginative leap which one hesitates to condemn. IBM was beginning at that time the development of the FS series and the Q operating system with much the same aims in mind, if it had succeeded in bringing these to market in 1978-1979 as planned, ICL could only have survived on the mainframe market by offering its users an equally imaginative systems design.

Both IBM and ICL seem to have underestimated the throughput bottleneck caused by attempting to implement so many different functions on a centralised mainframe operating system, as well as the time required to implement such an operating system efficiently. But when IBM came up against these hostilities in 1974, it had enough contingency plans in its drawers to be able to cancel FS and Q and write off the millions spent on them to experience.

ICL, on the other hand, seems unlikely to have committed its main R&D resources too soon to the new series, and allowed both System 4 and 1900 Series hardware to wither on the vine from 1972 onwards. Apart from semiconductor memories introduced between 1972 and 1974, the last 4/72, built in 1975, and the last 1802Ts and 1803Ts, built in 1977, were little different

in processing power, main memory expandability and peripherals from their predecessors of 1968.

The restrictions this caused on both System 4 and large 1900 users' ability to expand caused them to put increasing pressure on ICL to announce its new series.

When ICL did launch the 2870 and 2880 in November 1974, it was much too early in the VME/B development cycle. Their early users were soon vociferous in their complaints about the new system's low throughput and MTBF. According to one 2870 user, it is only now, four years after its launch, that VME/B allows him to get the same job throughput on his 2870 as he was able to get on his 1904S using George 3. This has given the 2800 series a bad name in the marketplace, which it will take a long time to live down.

ICL seems also to have waited much too long in the 2900 series development cycle to give serious thought to ways of bridging 1980 and System 4 users to the new series.

Microprogrammed emulators did not become available under VME/B until 1976, and DME, to allow 2900 users to run the system entirely as a 1900 or System 4, until 1977. And DME does not allow 1900 mode users any larger main memory space than they would have had on a fully expanded 1804S.

In thus forcing its large users to convert their main source programs and data files in order to be able to run ICL product planners not only disregarded these users' interests in their investment in source programs, they also ignored the prime rule of computer customer base preservation: to make it as difficult as possible for customers to stay rather than to desert to the competition.

As a result, ICL has in recent years lost a much larger proportion of its big systems users than other mainframe manufacturers when those users reached the maximum expansion limits of their old systems. The lost causes include British Oxygen, Pilkington's, Gloucestershire County, Gloucestershire, GLC, Tesco, Norwich Union, to name but a few.

ICL's total share of the UK installed computer base by value is reckoned by IDC Europe to have dropped from about 35% in 1968 to 28% in 1978. During the same period, Siemens share of its West German home market rose from 8% to 18% if one ignores the 5% share inherited from Telefunken Computer in 1974.

In private, ICL executives are sometimes prepared to admit these days that they would have had none of it if they had gone for the safe solution of basing their large systems designs on System 4 or a System 4+1900 superset. But in the 1980s, they say, their bold gamble will be justified by events. Then ICL will have a established product range to offer at a time when other mainframe manufacturers will have to convert their hardware architectures to tackle their users' information system requirements. ICL will only be able to retain its lost market share if other

When ICL and English Electric announced their intention to merge their data processing activities in April, 1968, they undertook to continue to develop both the 1900 Series and System 4 to meet the needs of their respective customers until such time as these two ranges could be superseded by a common successor range.

The unstated but generally understood meaning of that promise was that the future common successor range would offer both System 4 and 1900 users a smoother upgrading path than a forced conversion from System 4 to 1900 standards or vice-versa would have done.

In this 10th anniversary feature Fred Lummd examines how far ICL has kept this promise to its users, and how content these users have been with the new 2900 series.

manufacturers' expense, however, if these are equally unwise and unlock their customer base and their source programs in order to grow. Nothing is less probable.

Honeywell has already demonstrated on its Series 60 how many different processor hardware architectures can be accommodated under a common operating system with upward compatible ICL. Now IBM is planning to use OS/MVS as the cloak under which to replace the centralised 370 architecture by a more modular multiprocessor design, in which 370-compatible "processing engines" co-exist with specialised back-end database inquiry, updating "engines", and others.

Such schemes preserve existing users' applications software investments, as ICL did not, so that those and the force of inertia will tend to keep most of their loyal to their current suppliers.

If ICL succeeds in winning back a larger share of the private commercial and industrial large-user market in the 1980s, it will not be because of the stark processing architecture and 4,000 Mbyte addressing range of the large 2900s, but because they will be the first mainframes on the market that can be equipped with truly parallel processing (DAP) and Content Addressable File Stores (CAFS).

These are truly worthwhile revolutions in computing and ICL can be proud of taking a world lead in them. But ICL could have fitted DAPs and CAFS just as easily to large systems developed from the 370-compatible System 4, and how much easier such systems would then have been to sell to the huge customer base of IBM 370 and compatible system users.

Meanwhile, while the large 2900 series systems have been eating up ICL's R&D resources, its income and profits have been contributed mainly by the 1900-compatible 2803/2804 range as well as by the System Ten and 1500 series bought from Slinger. It is vital for ICL's future stability and profitability that its currently well satisfied 2803 and 2804 customer base should not be put through the same unnecessary aggravation as the large 1800 users in the 1970s.

ICL should not, therefore, try to drop the 2803/2804 range, even when it has brought small-

er and cheaper native mode 2803 and 2804 systems to market running under a more compressed VME/K. Nor should it attempt to convert 2803 DME users to VME/K and the 2900 native mode when they have reached the limits of DME.

On the contrary, ICL should maintain and continue to develop the 2803/2804 range side by side with the larger 2900 series indefinitely into the future, as Univac has decided to do with the Series 80 and 1100, and as CII-Honeywell Bull intends to do with its Series 60 Level 64 side by side with the HIS-developed Level 66.

This means among other things raising the current 256K 24-bit word main memory limit on 2850 and 2860 systems running under DME 1900. It is a limit in no way imposed by 1900 processor architecture (whose 22-bit address mode allows up to 4M words to be addressed indirectly and in indexed mode) but solely by the EBRM executive from which Exec 2, Exec 3 and DME-3 have been developed.

It has not been noticed by small business and distributed processing users so far, but will become increasingly noticeable as main memory becomes cheaper and memory sizes of two or even four Mbytes become more common on rival systems such as the Digital Equipment TRAX.

It is doubtful, however, whether internal ICL product planning policies will allow this to happen, unless it is decided to follow IBM's example and split the company into two separate companies, one for small and one for large systems. The 2803/2804 range and all the ex-Slinger products would become the province of a small systems company comparable to IBM's General Business Group.

On present showing this would be a highly profitable dynamic and expanding company on world markets needing no government support whatsoever, provided it was free to plough back those profits that it does not distribute to shareholders into its own lines. The future competitiveness on world markets of the smaller systems should not be weakened by a continuing drain of the R&D funds that they have earned, to develop a large general purpose computer series with a much less certain future outside a British government protected market.

Hopes for the future

From page 15

so much these days. But our job is to manage our business in the most effective and efficient way in the interests of our shareholders and staff, and taking account of IBM has to be a part of that. Looking to the future, there have been some doubts about ICL's future commitment to unique high technology products like the Distributed Array Processor and the Content Addressable File Store. Dr Wilson firmly guarantees any doubt. We have to continue to

develop products like these," he insists. "No one company can be ahead of the field right across the board, but in some areas ahead of the field is always there, and I think we always have been. Two examples where we are ahead are in multi-layer board technology and in microcoding techniques. We are always prepared to take the kind of product to which we are committed, and we are committed to high technology products like the Distributed Array Processor and the Content Addressable File Store. Dr Wilson firmly guarantees any doubt. We have to continue to

	IBM		ICL			
	General Business Group	Systems Products Group	2900	System Ten	1500	
Parallel processing super-computers	—	—	VME	1600 DME	—	—
	—	—	2876 + OAP	—	—	—
	—	—	2872 + DAP	—	—	—
Large and very large serial processing systems in the ATLAS-Plus category	—	Model 3033	—	—	—	—
	—	3032	2876	—	—	—
	—	3031	2872	—	—	—
Medium-sized models	—	370/146	2880	2860 DME	—	—
	—	125	—	2850 DME	—	—
	—	116	—	2804/50	—	—
System 3/15 3/12	—	—	—	2803/40	—	—
Multi-station transaction processing systems for distributed processing and small businesses	System 34	—	—	—	Tan/220	—
Single-station systems	System 32	—	—	2803/20	—	—
Desktop system	5110	—	—	—	—	1500
Languages: Cabel	—	3/12 & 3/16 only	Yes	Yes	—	Yes
	—	Yes	Yes	Yes	—	—
	—	Yes	Yes	Yes	—	—
RPG II Fortran Basic ALP/1	Yes	—	Yes	Yes	—	—
	Yes	—	Yes	Yes	—	—
	Yes	—	Yes	Yes	—	—
Operand length (bits): Floating point Fixed point binary Decimal (digits)	32	32	32, 64, 128	32, 64, 128	48	—
	—	—	16 or 32	16 or 32	24	—
	—	—	1-31	1-31	1-10,000	1-31
Alphanumeric character (bits) Individually addressable	8	8	8	8	8	8
	Yes	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes	Yes

Table 3: IBM and ICL ranges available today in rough order of comparable processing power.

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CHESSLAB

A masterly game and a rewarding challenge

By Donald
Michie

IN the razzamatazz of world championship computer chess we have been hypnotised into overlooking some very remarkable home produce. The first seeds of the British program Master were sown by Alex Bell. Tended and trained by John Birmingham of AERE, and Peter Kent of the Rutherford Laboratory, Master has reached a point of maturity at which it probably has more built-in chess knowledge than any program in the world.

Why then did it not ace the world pool at Toronto last summer? Remember that it suffered a 2:1 disadvantage compared with Moscow's Kaissa because of the communication delays imposed on remote operation by the tournament rules. As for Chess 4.6 we can throw in another factor of 5 at least, corresponding to the hardware advantage of CDC Cyber 176 over an IBM 370/168.

Since then Master's education has come on apace, including little things like recognising immediate mates "at a glance" instead of flogging the legal move generator through all possible variations and replies.

Most convincing of all is Master's recent coup in playing a human expert under conditions amounting in effect to lightning chess from the machine's side, yet allowing the human the normal time for making his moves. To have achieved a draw under these conditions, which

limited Master to a fixed lookahead depth of five ply, could only have been done by marshalling very considerable reserves of chess knowledge, for at times during the game the human was plainly looking further ahead than the machine. Nick Jackson is known as a strong tactician and is graded about BCF 2100. Here is the game, with commentary by US National Master Danny Kopec:

WHITE Master
BLACK Nick Jackson
1. Nf3 d5
2. c4 dc

This is generally scorned as ceding the centre, but it will be interesting to see how White will recover the pawn. Computer programs are notorious for bringing out their Queen too early, and perhaps Jackson thinks he might get an early initiative by drawing out and attacking the White Queen after 3.Qa4Ch, though this is quite playable.

3. Nc3 a6
4. Nxc4 b5
White's grip on e5 is challenged since 5.N/c-e5, f6 6.Nd3, e5 is awkward for White.

5. Nc3 b7
6. g3 g6
This is all in Master's book repertoire.

7. Bg2 Bg7
8. d4 Nf6

8. 0-0 0-0
10. Nc2
The Knight on e3 is a funny piece. While being well-placed itself, it obstructs the QB, and the KP. The move played admits its awkwardness, and Black is already better thanks to his control of d5 and e4.

10. ... N/b-d7
Master keeps expecting ... e6, but this is an unnecessary weakening of the dark squares.

11. a4 c5
12. Bc3 Nd5
Black is even contesting White's control of d4. Pointless and weak. Bg5 is better.

13. Ng5f
13. ... Nxe3
14. txe Nxe2
15. Kxg2 a5
16. Ne4 cd

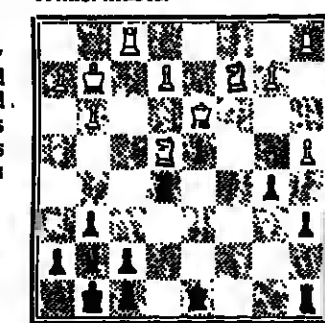
White had a horrible pawn structure and position. The move played is OK, but Qb6 is more poignant.

17. ad ed
18. Qd3

If 18.Nxd4, Nb6 and White's position is very loose. Master expected this move, though it is not best. Better is 16... Qb6, i.e. 19.e3, f5 20.Qb3Ch, Kh8 21.Ng5, Qb7Ch 22.Kg1, Nc5 etc. Also good is 16... Nc5! 19.Nxc5, Qd5Ch etc. (Qc7 or Qe7).

18. ... Nb5f
18. Qxd4 Qxd4f
20. Nxd4 Nc4

White: Master



Black: Nick Jackson

Figure 1: Position after 18... Nb5f

20... Ng4 wins and was expected by Master. Now White gets counter-play.

21. Nf6Ch Kh8
22. Rf4 Rf1-d8
23. Nf3 Nxb2
24. ab ab
25. Rxe8 Rxe8
26. Ng5 Re7
27. Nd5

27.N/fxh7 also works.

27. ... f5
28. Rh4 h5f
h6 is much less weakening.

29. Rb4 Rb7
30. Nf4 Rb6
31. Nd5 Rb7
32. Nf4 Rb3

The only winning try at this stage.

33. Rb3 b4
34. Nxe6Ch Kg7
35. Nf4 Rb7
36. N4 Kh8
37. Nd5f

White forces things too soon.

37. ... Rxe2Ch
38. Kf3 Rd2
39. Nxc3 Rd3Ch
40. Ra2 bxc3
41. Rb6Ch Kg7
42. Rb7Ch Kf6
43. Rb8Ch Kg7

Black should rush his King to the support of the passed pawn with 43... Ke5 if he wants to make a serious effort to win.

44. Nf3 c2
45. Rb6 Rf13
Now the game is a clear draw.

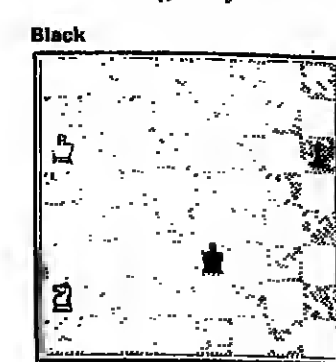
46. Kx13 Nd3
47. Rxc2 Na1Ch
48. Kf4 Nxc2
49. Kxf5 Nd4Ch
50. Kg5 Ne2
51. Kxh5 Nxx3Ch

And the game was drawn in a few moves.

We can assess this game by saying that neither side played well enough to win. Black made numerous errors in not exploiting White's poor middle game position.

Since the game ended up with only king, pawn, king and knight on the board it is pertinent to mention Grandmaster

Shamkovich, who recently visited this country. He has been tormenting his colleagues with the following study:



White

Figure 2: White to move and draw.

How on earth is the knight to get round so as to arrive at the right time and place to stop the enemy pawn? Shamkovich solved it in under two minutes, but that all others have agonised for at least hours or days. Indeed one chess-playing friend of his has at the time of writing been hard at it for the past two months!

Computer Weekly readers, the ball is at your feet! Chesslab will pay a prize of £10 for the best solution received. "Best" will be adjudicated according to the completeness, persuasiveness, and (where appropriate) simplicity of the conceptual analysis accompanying a correct solution.

Commercial model added to Eclipse

ANew commercial model at the bottom end of the Data General Eclipse minicomputer line has been added by the company in the US. Called the Eclipse 1150, it is based on the same processor as the S/130, small scientific machine, but excludes the specialised arithmetic features, replacing them with enhanced means for efficient running of C++.

Priced at between \$75,000 and \$150,000 in the US, the 1150 is designed for both stand-alone working and as an element in a network.

At the other end of the range, Data General has doubled the main memory capacity of the powerful Eclipse M/680 to one megabyte. The M/680, announced at the beginning of the

year, incorporates a 32K-word Eclipse processor as the communications front-end (CW, January 28).

The Eclipse family now includes three commercial models, the C/150, C/330 and C/350, three scientific models, the S/130, S/230 and S/250, the array processor AP/130, and the multi-purpose large-scale timesharing M/680.

Data General claims that the M/680 is unrivalled in the large minicomputer market in that it can handle up to 64 simultaneous users, suggesting that among the competition, the HP-3000 from Hewlett-Packard cannot run so many jobs simultaneously and the DEC PDP-11/70 and VAX-11/780 and the largest Prime machines cannot

support so many users.

The AP/130 consists of an S/130 processor with an array processor back-end, both processors having direct memory access. It also incorporates additional microcode instructions and hardware for more efficient processing of arrays than is possible using Fortran.

The company also has a growing family of packaged "CS" systems for the DEM business systems builder.

There are two principal operating systems on the Eclipse line: the Novm RDDS and the new AOS timesharing, batch and real-time operating system. Languages available under ADS include Cobol, PL/I, Fortran IV and V, Basic, the IDEA transaction language and DG/L.

Scicon consultancy regrouping

A REORGANISATION of the Scicon consultancy and bureau group into three subsidiaries under a holding company has been announced. Aim of the reorganisation is to manage better the rapid growth of the company, wholly owned by British Petroleum. Group turnover for the current year is projected to reach £26 million, compared with £12 million in 1976.

The three companies are the Scicon Computer Services Ltd bureau, the German consultancy SCS Scientific Control Systems GmbH, and Scicon Systems International Ltd. It is in the last-named that the main reorganisation has taken place. Its formation brings together nine subsidiaries which from time to time have operated

in 50 countries over the past 10 years. They are particularly active in Europe and the Middle East.

This newly-formed grouping is to be headed by L. R. Board as chairman and Julian Vear as chief executive. Board is also chairman of the group holding company, while Vear is a chartered accountant who has managed Scicon's financial affairs. The new group expects a £12 million turnover this year.

These behind comes the German company, projecting £11 million with one fifth coming from outside the Federal Republic, mainly in America, East Germany, the Soviet Union and Poland.

The bureau, running on Univac 1188s at Milton Keynes, projects a turnover of £3.5 million this year and is growing at an annual rate of 25%.

On the possible merger or acquisition of Scicon, Board says that any opportunities or offers will be considered carefully, adding that change will continue to be a major part of life at Scicon.

Merlyn Rees to address conference on privacy

A CONFERENCE on computers and privacy is to be held next January, jointly organised by the National Council for Civil Liberties, the Institute of Data Processing Management, and the National Computing Centre.

Keynote speaker will be the Home Secretary, Merlyn Rees who will present the government's plans for privacy laws and its response to the Data Protection Committee's report.

The conference is intended basically to discuss the DPC report, and has had to be postponed several times owing to delays in completing the report. This is now ready and is due to be published in the next few weeks.

Venue for the meeting will be

the Rembrandt Hotel, Knightsbridge, on January 24 and 25.

Liberal leader David Steel will open the proceedings, and other participants will include Professor Alan Weston, Charles Reed, and Paul Slaght from the DPC, Kerstin Auer, Swedish Education Under-secretary, and possibly Christopher Layton from the European Commission.

The planned programme is in four sections: On the first morning, consideration of the Data Protection Committee report; on the first afternoon, four simultaneous workshops on cost, employment records, and the like; on the second morning, news of what is being done in other countries; and on the second afternoon, questions and answers.

IBM 3750 exchange linked to Univac 1100

A LINK developed by Triad Computing Systems of London enables Constructors John Brown to transfer details of telephone calls recorded on its IBM 3750 exchange to a Univac 1100 computer for detailed analysis. Calls related to engineering projects all over the

world can then be charged to the appropriate client. Triad claims this is the first time a 3750 has been linked to a Univac 1100. The same software will be used for real-time recording and analysis of data on a 3750 and a Univac 1100. Offices in London



Development systems offered on rental basis

DEVELOPMENT systems from Intel and Motorola are now being made available on a rental basis from Livingstone Hire, a company that has specialised in renting electronic instruments to industry.

This is the company's first sally into the microcomputer business. Initially, only two systems will be available: the Intel MDS221, and the Motorola Exorclor (pictured above).

The systems will be available at between £800 and £1,800 a month, depending on configuration, and in-circuit emulators will be available for an extra £300 a month. Full hardware and software support will be available through Livingstone.

equipment. Livingstone is investing about £100,000 to provide the equipment on a rental basis.

Further orders for 12B modems worth £4½ million bring the total ordered from SE Labs by the Post Office to nearly £10 million. Developed for Datal 2412, the 12B is also suitable for the International Datal 2400 service.

Tenth birthday surprise

LAST weekend, ICL was given an unusual tenth birthday surprise when the racing car it sponsored gained its first Formula 3 win.

Driver of the ICL car, New Zealander Rob Wilson, was first in the British Championship BP race at Mallory Park, on October 15, boosting his overall position in this series of races to fifth, with one to go at Thruxton on October 29. Wilson has already finished fourth in the Formula 3 Vauxhall series, which runs in parallel to the BP races.

Wilson told Computer Weekly he was "over the moon" at winning and that he was particularly pleased to have brought success to his ICL backers.

£4½m modem order

FURTHER orders for 12B modems worth £4½ million bring the total ordered from SE Labs by the Post Office to nearly £10 million. Developed for Datal 2412, the 12B is also suitable for the International Datal 2400 service.

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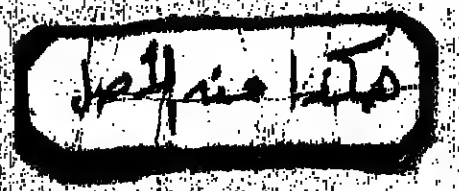
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How to create more jobs without inflation

By Geoffrey Beacon

THE desire to increase employment without inflation is motivated by the belief that increased leisure cannot be the complete solution to the unemployment problem which is being brought about by the combination of the limits to growth and improvements in labour productivity.

There are two main reasons for this belief. The first is that we still live in a work-oriented society. For the majority, achievement derives substantially from employment. The second reason is that leisure should not be forced on people, either by unemployment or short-time working, who could enjoy shorter periods of leisure a great deal more with the extra income that comes through employment.

In the UK approximately 90% of the cost in producing the gross domestic product is accounted for by wages and salaries, including income from self-employment, which in turn creates 90% of the national income.

As a first approximation, but quite a good one, we can ignore other forms of income such as rents, profits and transfer payments, and divide the working population of approximately 25 million into five groups of 5 millions each with earnings of £40, £80, £100 and £120 per week. (In fact the middle three-fifths of the working population earn slightly less and the top fifth slightly more.)

Although such large differences in income are deplorable, it is an unfortunate fact that unemployment exists mostly among the lower paid. This indicates that the wages of the group as a whole are higher than that necessary for full employment.

A rough estimate of current unemployment for each group is taken in Table 1. The reduced

percentages in the last column have 1.5% subtracted to account for that level of unemployment that is thought to be the irreducible minimum.

Sometimes right-wing economists will say that unemployment is caused by monopolistic factors in the labour market. They are clearly referring to those factors which keep the wages of the less well paid above the values necessary for full employment. Two examples of these monopolistic factors are unemployment benefit and the bargaining power of trade unions.

One advantage of labour subsidies is that there can be an increase in employment for the less well paid without a fall in their income. In our simplification of the economy, for this to be true, these labour subsidies must be paid for by taxes which fall largely on the more affluent.

For the purposes of the calculation in this article the tax considered for raising the revenue will be VAT and the total labour subsidy paid will be set equal to the revenue raised.

VAT raises tax on goods and services proportional to their total cost. This in turn can be considered a tax on the factors used in producing the goods or services.

As an example for our simplified economy, Table 2 shows the first effect of raising an extra VAT just over 10% on all goods and services and using the money raised to subsidise labour on a per worker per week basis.

It can be seen from Table 2 that a policy of labour subsidies paid from expenditure tax applied to our simplified economy would decrease labour costs for the bottom end of the labour market and increase them at the top end.

This would have the effect of increasing the demand for labour and thus increasing

Table 4. The estimated effects of a blanket labour subsidy paid from VAT which creates 10% more jobs among the £40 per week group using a labour only model of the economy.

Elasticity of demand = 0.2 (Vat = 84.4%, labour subsidy = £44.8 per week, production rises 1.1% in real terms).

Wage group	Extra jobs	Wage change	% Standard of living change
40	10	0	+2
80	+4.7	0	+2
80	+1.8	0	+2
100	0	-0.02	+2
120	0	-1.18	+1

Elasticity of demand = 0.8 (Vat = 18.7%, labour subsidy = £16.5 per week, production rises 1.6% in real terms).

Wage group	Extra jobs	Wage change	% Standard of living change
40	+10	0	+18
80	+2.3	-6.88	+8
80	0	-18.88	-5
100	0	-32.47	-14

Elasticity of demand = 1.0 (Vat = 7.4%, labour subsidy = £7.4 per week, production rises 2.1% in real terms).

Wage group	Extra jobs	Wage change	% Standard of living change
40	+10	0	+4
80	+3.8	0	+4
80	+0.8	0	+4
100	0	-2.14	+1
120	0	-7.08	-2

employment for the lower paid. For the better paid, the percentage increase in costs is much less than the decrease for the lower paid so the decrease in demand is likely to be small in comparison.

In any case this decrease in demand is more likely to manifest itself as a downward pressure on the wages of better paid rather than unemployment, because for them the 'monopolistic effect' of unemployment benefit is less. That is: they lose much more than the less well paid by being unemployed.

The extent to which a change in the cost of labour changes the demand for labour is described by the elasticity of demand for labour. At this stage of the argument its value is not a crucial factor because if the elasticity is low the desired level of employment can be created by choosing appropriately high levels of VAT and labour subsidy.

For later consideration, however, Table 3 gives the rates of VAT on the present model to produce 10% extra demand for the lower paid on the assumption of different values for the elasticity of demand for labour.

Depressing the level of wages of the better paid depresses the money value of national output as the rate of VAT must be somewhat higher than shown in Table 3 to pay for labour subsidies. Since, however, national output is not decreased the value of money is increased and those with the same money wage are better off.

Extra jobs do, of course, save public money, both in the form of reducing the expenditure on unemployment benefits and increasing tax receipts. Work by economists such as Santosh Mukherjee has shown that such savings are of the order of 90% of

an individual's working wage. A contributory factor to this seemingly high figure is that most of the unemployed are not high wage earners.

The sums involved, however, are so large that, if the elasticity of demand for labour were greater than about 1.1, labour subsidy schemes become self-financing — the subsidy paid being less than the savings in expenditure caused by a worker becoming employed.

Table 4 is calculated on the assumption that the elasticities of demand are the same for each group, that increased labour costs for the higher paid merely depress their wages and that decreased labour costs for the lower paid increase employment among them with subsequent savings in public expenditure, these savings being used to finance the labour subsidies.

Since the elasticity of demand

RECENTLY several letters and articles in Computer Weekly have suggested a means of tackling the question of the effects of microelectronics on employment. That is: to introduce some financial mechanism to reduce the cost of labour as a factor of production. And by reducing its costs increase demand and create more jobs. This aspect of the debate has, however, been one-sided says Geoffrey Beacon, a research fellow at Leeds Polytechnic.

There has been no disputing the claim that such mechanisms could be effective, although there has been some discussion as to the relative merits of such mechanisms.

In the absence of any reaction it is perhaps worthwhile showing, with what Beacon says is an admittedly crude example, how one such mechanism, labour subsidies paid by expenditure taxes, might be used to reduce current levels of unemployment without causing inflation.

for labour gives an estimate of the labour cost at which the desired level of employment is reached, an estimate of the market's valuation of the extra labour employed can be obtained.

The value of this extra labour is the value of extra production and is shown in Table 4.

The change in standard of living shown for each group is due to a combination of this extra production and the deflationary effect of reducing the wages of the better paid.

The factors of production other than labour form only about 10% of the national income, after allowing for capital depreciation. These factors can broadly be put under the heading of capital.

The income that derives from capital includes such things as rent on land and buildings, not

profits from using plant and machinery and net income from the sale of minerals and other natural resources.

The effect of raising VAT to pay for labour subsidies would be to tax these other factor incomes (by taxing the end product and subsidising only the labour components).

Table 5 has been calculated on the assumption that income from capital is £500m per week and the even more arbitrary assumption that the elasticity of demand for capital is the same as the elasticity of demand for labour.

Crude though this calculation has been, it has shown at least the possibility of increasing employment without causing inflation — a possibility surely interesting enough to warrant further discussion.

Table 5. The estimated effects of a blanket labour subsidy paid from VAT which creates 10% more jobs among the £40 per week group using a model of the economy with elasticities of capital and labour use set to the same value.

Elasticity of demand = 0.2 (VAT rate = 46.2%, labour subsidy = £38.5 per week). Change in capital income = -8%. Production rises 1.7% in real terms.

Wage group	Extra jobs	Wage change	% Standard of living change
40	+10	0	+8
80	+3.8	0	+8
80	+0.7	0	+8
100	0	-0.76	+0.5
120	0	-16.03	-7

Elasticity of demand = 0.8 (VAT rate = 18.7%, labour subsidy = £16.0 per week). Change in capital income = -8%. Production rises 2.7% in real terms.

Wage group	Extra jobs	Wage change	% Standard of living change
40	+10	0	+3
80	+5.4	0	+3
80	+1.8	0	+3
100	0	0	+3
120	+0.4	0	+3

Elasticity of demand = 1.0 (VAT rate = 4%, labour subsidy = £8.34 per week). Change in capital income = -5%. Production rises 2.7% in real terms.

Wage group	Extra jobs	Wage change	% Standard of living change
40	+10	0	+3
80	+4.5	0	+3
80	+1.5	0	+3
100	0	-0.70	+2
120	0	-3.88	-0.1

Gas WP plans wait for the unions

● From front page
West Midlands Gas is Cyril Howarth, a well-known figure on the word processing scene. He wants to link the Wordplex 7 to an ICL mainframe and then to a COM recorder, thereby replacing carbon copies of letters entirely by microfilm. (Mainframes the gas board has at present are all ICL, a 2876, a 1904A, and a 1904S).

He also wants to be able to design and produce forms on the WP screens and then have them produced automatically on the photocopier. The ruling of both vertical and horizontal lines is seen as one of the major difficulties here.

Further in the future is a plan for electronic mail by communicating with word processors in gas board area offices via

an existing microwave radio link.

Technical difficulties abound in these plans, and it remains to be seen whether it will be Howarth or those who scoff at him who has the last laugh. Union problems are more immediate, however, as they are in several organisations contemplating WP. Other unions expressing concern are Apax

auditing procedures, they considered necessary. Credit and Commerce terminated its contract with Word in July and has been operating a purely manual system since then. But the company has now ordered an INCR 8250 system which will be run in-house.

(CW, Sept 28) and CPSA (CW, Oct 12).

Manning levels, job satisfaction, and the grading of operators are the main preoccupations of the unions. Whether there can be any arguments over manning levels is doubtful as any system has a specific number of screens and that determines the number of typists needed.

System failure hits company

● From front page
defined manual accounting system at Credit and Commerce, with which to run the computer system in parallel.

Auditors Price Waterhouse said in the last Credit and Commerce annual report that they were unable to carry out all the

Why one DPM is happy to 'put the clock back'

By Rosemary Pyne

WHEN the DPM manager of a company maintains he has installed a teleprocessing monitor in order to "put the clock back", it's quite a thought.

But for David Edwards, DPM at Allied Industrial Services, this is exactly the way he views his use of Informatics' Minicom package, now Westinghouse's Westi. Because at AIS putting back the clock means restoring to the user departments the ease of access to and responsibility for the company's information which they had before any computers were installed.

A VDU-based TP system has in fact turned out to be more economic than a batch system. Apart from providing information directly to the user, as and when required, the screens have even offered price reductions. Before the screens were installed, AIS used to print the major files daily after updating, but now that they have gained confidence in the new system there is no necessity for the mass reprint.

In a single month the saving on the one-part and two-part stationary previously required pays the rental on a number of screens.

AIS application is not particularly unusual, but perhaps the methods used to solve the problem are.

AIS is one of the largest UK industrial laundry and dust control rental organisations. Since its establishment in 1964, the company has had its roots in Bradford, Yorkshire. And it's here at Lidget Green, Bradford, that AIS runs a 256K IBM 360/40 complete with nine 2314 disc drives, card reader and line printer and 13 TIT 3280 VDUs.

But in March, 1976, when the company first considered tele-

processing, the machine was a modest 360/30 with only 64K memory. Current batch work, together with spooling, meant the ideal TP monitor would have to use only 20K of memory, including applications programs. As Edwards says, this meant AIS was obliged to buy Minicom, which was the only suitable size monitor on the market.

The original intention was to run a data entry system, putting

application could have been very awkward. "We saw we would all have to learn; the DP department as well as the users. So we decided to try a simple inquiry facility. It's lucky we weren't led astray by salesmen. What we set out to produce was a user system and not a DP extravaganza with lip-service being paid to the user side."

The inquiry application itself is larger than it appears. Screens are placed in the credit control, customer relations, general administration and cash offices. And there are plans for a screen in the distribution area. The number of transactions obviously varies, but Edwards reckons an average would be between 3,000 and 3,500 per day. However, AIS is expanding and these figures are expected to grow over the next financial year.

Further projects are also planned and the first data entry system has been scheduled for the summer of 1978. But Edwards stresses, his department has been very pleased with Minicom. "From the time we had the first screen in the office to having the application up and running live was six weeks. Yet everyone we spoke to maintained the programs would have to be written by TP experienced personnel. We simply haven't found this to be the case."

"Our main TP language is, and always has been, ANSI Cobol. We have no hesitation in utilising programmers trained in Cobol for writing our TP applications. In fact, many programmers have found TP programs easier to write than batch."

Unfortunately, the rising number of transactions is causing the software to, as Edwards puts it, "creek". "Primarily, this is because

Edwards now sees that to go straight to a data preparation



David Edwards, DPM at Allied Industrial Services, maintains he has installed a teleprocessing monitor in order to "put the clock back." He views his use of Informatics' Minicom package, now Westinghouse's Westi, as a means of restoring to the user departments, the ease of access to and responsibility for the company's information which they had before any computers were installed. Rosemary Pyne, who met and talked to Edwards, describes here the reasons which led to the decision for installing the package and also the benefits which have accrued since then.

The VDU-based system has in fact turned out to be more economic than a batch system, and apart from providing information directly to the user as and when required, the screens have even offered price reductions. In a single month the savings on the one-part and two-part stationary, previously required, pay the rental on a number of screens. Rosemary Pyne adds that AIS' application is not particularly unusual, but perhaps the methods used to solve the problem are.



VDUs are located in several user departments and new applications are being studied.

Minicom is single thread. Even so our users may have noticed no degradation yet, but we have. One point has now become obvious: because Minicom exploits single-thread to the full, it's easy to use. But with multi-threading, we have to accept a more complex product and application programs. We initially set out to find something better than Minicom but with more than one task currently active, and, to be fair, we couldn't find it.

"Now with an increasing number of screens, currently 13 and due to rise to 18, the possibilities of operators hitting any one of the SEND keys concurrently are becoming greater and the response time is becoming adversely affected. Statistically the more screens, the worse the position becomes. Westi stayed away, because with the other TP monitors we examined the suppliers said, we would have to have staff on-site for so many days to help us use it. They all told us how we should design our system, whereas what we really wanted to know was how their TP monitor would fit in with our design."

"With Westi we simply used the manuals and had a free trial period. We didn't want the implied interference the other suppliers offered. We pride ourselves on being essentially a service company, so we need to be able to react quickly and stand on our own two feet without having to rely on any TP company. I can't understand the great need for support. In my view if you need support, you don't want the package. On the other hand if we do need the aid of help, providing the support can be had over the telephone."

Edwards claims that Westi gives him application design freedom. Partially, this is because AIS already had a TP system running under Minicom and the DP department felt any change to a new monitor should be completely transparent to the users. They shouldn't even know, Edwards found that with most TP monitors he was obliged to design systems where users had to sign on and off. AIS wanted the user to be able to switch between programs with little or no fuss. Signing on and off struck AIS as time wasting and essentially wrong, except where security demanded it. With Westi, AIS could see a way past the difficulty. Changes to the system were only minor formatting ones.

AIS uses its own access method and its own database system, none of which intruded most TP monitor suppliers. But to AIS it made sense to retain their well tried access method and data organisation, so the programmers could concentrate on the TP application areas.

The original Minicom system had gone live in 1976, simply with no system of programming errors right from start. Westi will help AIS live up to the initial access with more complex applications programs. It is also expected to give better response than the old creaking Minicom system, better

still, it will offer more potential and greater flexibility, with extra capacity available.

Edwards feels their experiences could be valuable to other users. The TP programming philosophy at AIS has always been one of easy-to-understand Cobol programs, simple structure and simple to write, understand, test and use. Westi fitted into this concept particularly well, according to Edwards. "When we first became interested in Westi we lined up an experienced member of staff to chat with the Westi technical man. Unfortunately, she was ill and a more junior person had to take over."

"As a result, at 20 and with only 15 months' DP experience behind him, he was made responsible for the conversion project from Minicom to Westi."

AIS is also proud of its database system, which they describe as similar in concept to Total. The result of their system is that they are able to access any piece of data by its disc address, with no tortuous algorithms involved. The database is essentially a file of data at different logical levels. There is a prime key of seven bytes for each customer account number and this is followed by data of different levels. Levels identified by a four-byte binary field. To allow for any expansion, there is space for every possible binary key from 0000 through to 9999. Data is therefore available by its keyed address.

While, as Edwards admits, the file may be over-engineered at present, there is room for expansion, so there are no artificial limits on file size or arrangement. New data is simply assigned a new level and an associated four-byte binary key.

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BANKING AND INSURANCE

Cash in on your special skills

THE banking and insurance industries are dominated by a number of very big companies that prefer to acquire their computer staff by recruiting school-leavers and graduates and putting them through well organised internal training schemes rather than hiring experienced DP professionals. In addition, the incentives of employment offered by banks and insurance companies and the collection of perks that often go with the job mean that their staff turnover is low compared with other sectors of commerce and industry.

But there undoubtedly are openings for the right sort of experienced systems, programming and operations people in banking and insurance, especially if they satisfy a particular need.

For example, one major bank actively seeking experienced personnel at the moment is the Midland, which is prepared to pay juniors of 18/19 years old between £3,500 and £4,500 a year to work as operators at its computer output microfilm bureau in London, provided they have at least six months' experience working with some kind of computer equipment, not necessarily COM.

The Midland is also looking for experienced systems analysts to be based at Sheffield where most of its systems and programming staff are located those days.

A lot of the 250 staff there moved up to Sheffield from London and the Midland says that the vast majority of them were prepared to make the move because of the financial incentives they were offered.

Most of them would not consider moving back to London, according to the Midland, now that they have experienced the advantages of provincial life, like being able to drive to work instead of commuting up to the City on crowded trains.

The Midland likes the Sheffield area so much that it is now moving the head office and DP centre of Midland Bank International up to nearby Barnsley from Gracechurch Street in the City. The operation will be housed at an impressive new centre that should be completed by 1980 and will employ about 300 staff, many of them recruited locally.

Barclays is another major bank that prefers provincial life. Most of its systems and programming staff have

been based at Knutsford in leafy Cheshire for the last two years. The bank's two main London computer centres at Herlestown and Tottenham Court Road will be relocated to a new site at Gloucester by the middle of next year.

Some of operations staff from the two London centres are not keen about making the move and a number have left the bank already for that reason, so Barclays is now recruiting trainee operators in the Gloucester area.

Lloyds Bank is taking the opposite approach to Barclays and the Midland by concentrating most of its computer power in central London at Bankside, just over the Thames from St Paul's Cathedral.

Another difference between Lloyds and Barclays is that the former maintains salary scales for its DP staff that are related to the scales for the rest of its workforce, while at Barclays, DP staff not only have their own separate salary scales but programmers and analysts have a scale different from operators.

However, the market value of programmers and analysts has persuaded Lloyds to pay them what is called a "technical allo-

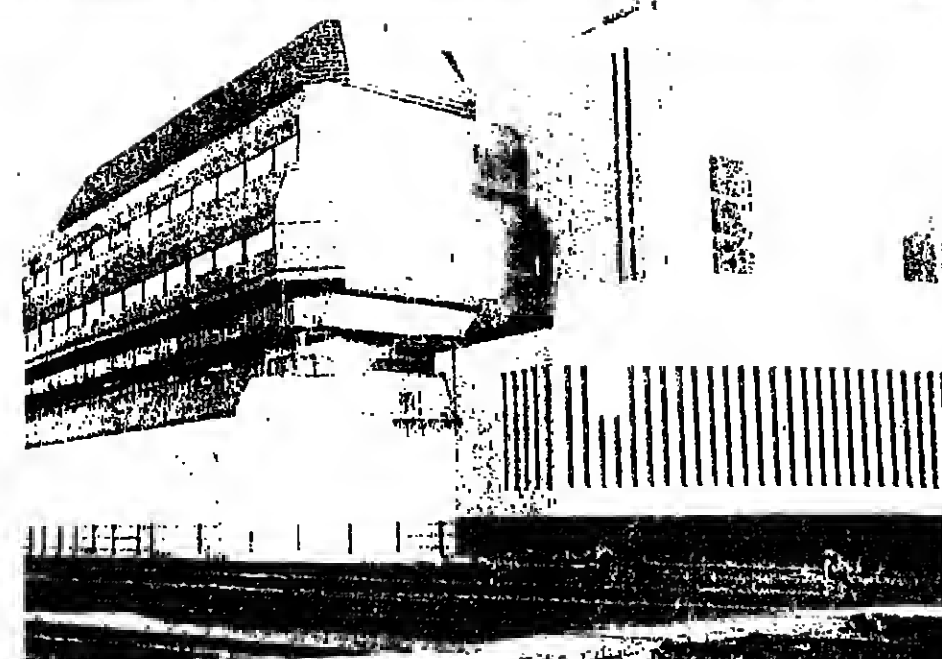
wance" on top of their basic salary and the bank is understood to be seriously considering introducing separate salary scales for its DP staff.

Lloyds does not pay the technical allowance to its operators, an indication possibly of the relative decline in demand for operators among banks and big computer users in general now that DP workloads are tending to be concentrated on one or two very big systems instead of several medium sized configurations and applications are being converted more and more from batch to online processing.

One of the country's best known insurance companies, Prudential, for example, says that it has already had to move about a dozen of its operators over to programming because its line-up of mainframes has changed from six medium sized machines to two big ones — dual 370/158s.

The Prudential adds that the fall-off in its requirement for operators is now so substantial that any new operators that still need to be recruited must pass a programming aptitude test.

The Prudential maintains separate salary scales for its DP staff to make sure,



Lloyds Bank new centre, across the Thames from the City, where most of the bank's computer power is located.

according to the company, that their salaries are in the upper quartile of the current market rates.

The Prudential points out that it does not lose more than 10% of its DP staff in any one year and that the percentage was considerably lower than 10% in 1978.

At the same time the company does not take on many experienced staff from outside because it finds that they tend to want something like £1,000 more than they are being paid in their existing job to do the same sort of work.

The Prudential prefers to recruit and train its own staff from "A" level school-leavers and university

graduates, as does Royal Insurance, whose DP staff are nearly all located in Liverpool. The Royal operates an IBM 3033 there which forms the centre of a terminal network providing online claims processing facilities for its 260 branches.

The attitude of the National Union of Bank Employees towards remuneration in the industry is one of extreme discontent with the way that the government's pay policy forces banks and big companies, to toe the line while a lot of smaller employers can get away with paying their DP staff more than the agreed limit.

The banks have a particular problem at the moment because they award across-the-board pay rises in July each year — the back end of the existing government pay cycle which runs from August to August — so their employees have to wait 11 months before they can catch up with whatever percentage rise has been agreed for that cycle.

According to NUBE, programming staff are especially annoyed if their bank is forced to employ a contract programmer for a fee that is far higher than the salaries paid to full-time personnel.

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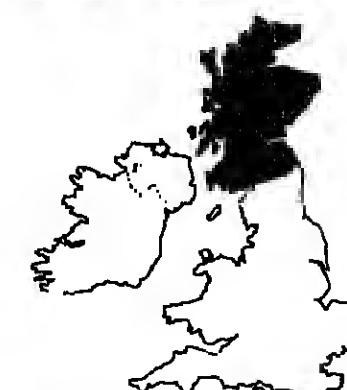


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Applications will be treated in STRICT CONFIDENCE throughout by us and our San Francisco associates. Please send full c.v., quoting ref 1002/CW, to Philip Smith:-

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Programmers Analysts Sales Staff

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All-purpose computer professionals are required with experience in programming or system analysis, or both. It would be an advantage to possess some knowledge or experience of accounting/financial packages. The positions offer involvement in a number of the following areas:

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Experienced Sales Staff are also required to meet the expansion in our business. They should have knowledge of accounting systems and preferably interactive processing. The positions offer a high basic salary plus commission, with a company car, and good promotional prospects.

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BCC Boeing Computer Centres Ltd.
St. Martins House, 31-35 Clarendon Road, Watford, Herts. WD1 1HA

BOEING need the best

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Shift Leader £6,300 inc.

British Home Stores have a vacancy for an experienced Shift Leader to join their installation in Central London. Hardware consists of a 1 megabyte IBM 370/145 operating under DOS/VS, POWER/VS. A 3031 is to be installed in 1979. The environment is rapidly developing and this vacancy arises due to expansion to a 4 shift system. In addition to the excellent salary, BHS offer substantial benefits including:

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- * 20% shopping discount
- * Season ticket loan scheme.

Successful candidates should have a minimum of five years' experience operating an IBM 370 under DOS/VS.

If interested contact Carol McGovern on 01-836 6775

Computer Personnel International
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Operations Supervisor £7,000+

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we have at Bellingham, a recently installed 2970 running under VME B; 2 x 1904S, a 1904A and a 1902T using George 2 and 3, with MAXIMOP and a large communications network, utilising front-end processors. *How's that for an installation?*

we perform work for over 300 customers, covering a wide variety of commercial applications and their development. You'd find it challenging here—your work could include both on-line running and off-line job preparation/development.

we want if you to recruit from experienced staff to cope with our dramatic expansion. would like to find out more about these exciting opportunities please ring 01-263 57010 or 01-890 1414, any time, day or night, between 11.00 p.m. on Saturdays and 8.00 p.m. on Fridays. or write to BARIC COMPUTING SERVICES LIMITED, FOREST ROAD, 1 ELLTHAM, MIDDLESEX.

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PROGRAMMERS—IBM Series/1

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The first phase of our long-term data processing plans has been completed with the successful installation of one of the first operational IBM Series/1 machines in Europe. We now wish to expand our in-house programming capability to develop this Real Time Multi-terminal system, operating under EOX into many other areas of the Company.

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Tel. 01937 544144

Dorset County Council

County Treasurer's Department

NEW ICL 2976 INSTALLATION

PROGRAMMERS

Salary £3279 to £4832 (inclusive of super-labour).

Dorset County Council are currently installing an ICL 2976 computer with a wide range of communications facilities.

Vacancies now exist for programmers, wishing to develop their COBOL programming skills by joining progressive project teams servicing a wide range of batch/TP applications.

Applicants should have received basic training in programming and have gained at least one year's practical COBOL programming experience. Knowledge of 2800 computers is advantageous but not essential as any necessary training will be given.

Application forms returnable by 2 November 1978 and further details from: County Treasurer, County Hall, Dorchester DT1 1XJ. Telephone: Dorchester 513. Ext. 2114. Please quote reference TR/C29/14.

Technical Support Staff

Rural Staffordshire Salaries up to £6,000

Our Operations Planning and Software Sections are looking for additional technical staff to complete their teams based at Burton-on-Trent.

Installation

Our current equipment is based around twin IBM 370/155's (under MVT/HASP/TSO) and a 370/14B with a nationwide TP network of 3270's under CICS. A 3032 is due in 1979 together with a mass storage system and will be run under MVS, with VSPC. Amongst other developments are the introduction of Distributed Processing using Series 1 minis, Database Systems, TSO and Personal Computing, and both Hardware and Software monitors for Performance Evaluation.

Operations Planning

The function provides general technical support and ensures the efficient use of operations resources covering hardware and procedural evaluation and implementation. We are looking for people with an in-depth knowledge of IBM 370 operating systems preferably with a systems programming background who have a practical knowledge of job control language and an understanding of operational practices.

Operations Software

This section provides a service to ensure the successful performance and availability of software and will involve the design, testing and implementation of in-house operating software. Here we need systems programmers with IBM Software experience in one or more of the above computing techniques. Above all applicants must be problem solvers, with the enthusiasm to develop their skills.

Salary Package

We are offering initial salary packages of up to £6,000 dependent upon experience with opportunities for further salary progression and career development within a professional environment. Additionally, there are excellent fringe benefits, and assistance with relocation expenses will be given where necessary.

Location

Our Computer Centre is situated at Burton-on-Trent within easy reach of major Midland conurbations. Moderately priced housing is available in attractive local villages.



ALLIED BREWERIES LIMITED

Please write or telephone for an application form to:-

Chris Scott, Personnel Officer,
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Allied Breweries Limited, 126 Station Street,
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Personal Please write in ballpoint, using block capitals.

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Are you prepared to relocate? _____ UK/Abroad (delete) _____

Experience Place no. of yrs. in box, e.g. IBM 360/370 ... **4**

Machines: Please specify model.	Applications
IBM 360/370	Commercial
IBM others (specify)	Financial
ICL 1900/2900	Payroll
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Honeywell	Stock control
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PL/I	
Fortran	Job Titles
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Others (specify)	Analyst/programmer
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DOS	Operations supervisor
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*Delete where inapplicable

Position sought Please state briefly the type of appointment you are seeking.

Minimum salary £ _____ Notice required/Date available _____

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Cut out the whole advertisement and post to the address below.

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01-491 4706

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SENIOR SYSTEMS ANALYST & SYSTEMS ANALYSTS



We'll lay on a great welcome for you

North Thames Gas is developing a Customer Service computer system to achieve further improvement in the standard of service to our customers. We attach great importance to this project, and the people who make it a working reality will be highly valued. It is a real-time system running on Data General C330 minicomputers, with over 60 V.D.U.s and we are now looking for a **SENIOR SYSTEMS ANALYST**.

You will need at least 2-3 years' successful experience in implementing systems in a commercial environment, ideally including experience of the design of software in collaboration with software programmers. You will be responsible for the definition of system requirements in liaison with user staff at all levels, and for supervising a small team of Systems Analysts designing, specifying and testing the required system.

We also need a number of **SYSTEMS ANALYSTS** with a background in programming

involving at least one year's experience in a commercial systems environment. If you wish to widen your systems experience then a career with North Thames Gas would be a wise move.

THE BENEFITS

The Development Centre for this system is in a pleasant building in Acton, West London, easily accessible by most forms of transport, and has free car parking nearby.

The salary range is £5553 to £7074 for the SSA and £5133-£6537 for the SA's and starting salaries will depend on experience. The many additional benefits include 25 days holiday entitlement, a first-rate social club and sports facilities which include squash courts, tennis and football.

This could be a very positive step forward in your career. We would welcome a call from you. Make the first move by telephoning Richard Twombles, Systems Manager, Minicomputers, on 01-991 0914, for an exploratory talk; or ask our Recruitment and Selection Officer on Staines (81) 61666, extension 3282 for an application form; alternatively write to him in sufficient detail to make an application form unnecessary at: North Thames Gas, North Thames House, London Road, Staines, Middx. TW18 4AE. Please quote ref. B9108 for the SSA and B9082 for the SA positions.

NORTH THAMES GAS

PL/1 Programmers

A career challenge
in program development
Footscray, Kent Up to £7500

IDEC is the Systems Development Centre of ITC Business Systems and Communication Group. This office in Footscray, Kent is involved in developing software support systems for the production and maintenance of products manufactured by the group. The growth of this function has created a need for additional Programmers with PL/1 experience.

We need software people who relish the challenge of working in a team, in which is dedicated to program development and operation, to be fully rewarded for their abilities.

We require a motivated and well-qualified programmer with one year's experience in PL/1, in their twenties, right up to the seasoned professional at the top of the ladder.

IDEC values your experience and the salaries we are offering will fully reflect the importance of your role. Fringe benefits are those to be expected from a successful, progressive organisation and career development prospects are excellent.

If you are interested in looking up your experience with IDEC, then telephone John Perry on 01-508 7788.

Alternatively write with brief career details to: Personnel Department, IDEC, ITC Business Systems, Canada Life House, High Street, Battersley, DERTS.

IDEC ITC
A Development Centre of
ITC Business Systems

Experienced ICL Programmers The Solent Area

Our client, a leading international group in the petrochemical industry, is looking for a computer programmer to join a small, friendly team in the Solent area.

The position offers a young man or woman the scope and opportunity to develop some two years' experience of COBOL on their newly installed ICL 2903, within an informal environment, whilst enjoying the benefits of a large organisation.

A knowledge of ICL software will be essential, and your duties will include the maintenance of library files.

Write in the first instance with details of age and experience to Mr. C. H. Smith, at the address below, quoting ref. B/287. Do not separately any companies to which your application should not be forwarded. All replies will be answered.

B&B CONFIDENTIAL REPLY SERVICE
Benton & Bowles Recruitment Limited,
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PROGRAMMER/ANALYST

To manage and develop systems on an on-line minicomputer installation in South Wales.

Salary offered: £5,500.

Apply to writing to: —

Mr. H. H. Clark, Director.

at the below address, or if preferred an informal chat of hours making will be arranged to discuss this opportunity by telephoning the number below.

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Applications are invited to the above post in the Computing Service. The Computing Service provides central facilities to all teaching and research groups for batch, multi-access and interactive computing. These facilities are based upon a large and ICL 2870 system and a ICL 2860 PDP 11/45 computer facility with online processors providing access to remote computers such as CDC 7600s.

The successful applicant will be expected to advise both experienced and experienced users on the effective use of the large range of local and remote facilities available. Some experience of working in a scientific environment would be an advantage but it is more essential to have an appreciation of user problems and to be able to communicate effectively with people at all levels.

Applicants should normally possess a degree or similar qualification but candidates with proven ability and experience would also be considered. The appointment will be on the salary scale £2584-£3504 or £3585-£4504 according to experience.

Further particulars may be obtained from Mrs. P. Vaughan-Smith, The University, Southampton SO9 0NH, to whom applications should be sent by 3rd November, 1978, please quote reference 1028/A/CW.

THE UNIVERSITY OF LANCASTER COMPUTER SERVICES DEPARTMENT APPLICATIONS PROGRAMMER

A vacancy has occurred in the User Services Section for a programmer to develop and advise on Applications Software for users in the Home View Universities Network. A degree or equivalent qualification is required and preferably some experience of computing in a research environment, possibly as a user. Salary on the scale £3585-£4504.

Further particulars may be obtained (quoting reference L55/A) from the Establishment Officer, University House, Lancaster, LA1 4YW, to whom applications (6 copies) naming three referees, should be sent not later than 23 October 1978.

WRITER FOR COMPUTER MARKETING

DEPT — 20/30

Systime is a rapidly growing major British manufacturer of mini-computer based business systems. Its consistent success ensures a highly stimulating working environment and significant opportunities for staff to extend their experience and income. The marketing department requires a writer to compile a quarterly sales oriented newsletter and an internal staff newsletter, prepare press releases and generate informative written material for the sales team.

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Apply to: Nick Willard, Systime Limited, Concourse Computer Centre, 432 Dewsbury Road, Leeds LS11 7DF. Tel: Leeds 707411 and 707281.

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Applicants should possess a broad general background in the subjects of Computer Science and preferably have specialised knowledge or research interests in the areas: Communications (Networking and Data Transmission); Real-Time.

Applicants should preferably have some significant industrial experience. Salary: Lecturer 'A' scale — £4058 to £7999 per annum.

Application forms and further particulars are available from: Recruitment Section, Paisley College of Technology, High Street, Paisley PA1 2SE. Telephone 041-987 1243 ext. 256. Please quote ref. 28/18/1. Closing date 31st November 1978.

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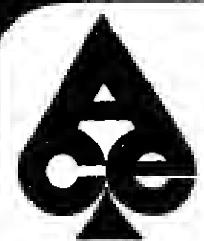
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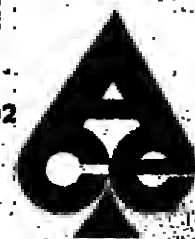
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If you would like:

- * To receive training in advanced IBM software.
- * Develop COBOL programs involving databases and TP systems.
- * Work on a variety of applications projects.
- * Five weeks' holiday a year.
- * Excellent starting salary and conditions of employment.
- * To join an active sports and social club.

— and you have a minimum of 12 months' COBOL programming experience, then this could be a good opportunity to accelerate your career.

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Your RPGII experience is of great value today and tomorrow. System 32/34, ICL 2903/4 are carrying this language into the future.

Our client not only recognises this value but is also able to utilise your experience to provide a challenging working environment where your capabilities will be put to the test and where work is an on-going process of improvement. Whether you have one year or five years' experience a position exists for you, where you will always be important and where you can expect to progress rapidly to project leadership. Salaries up to £7,000, working in and around London, are realistic but the ultimate rewards are far greater.

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If you have three years' programming experience gained on IBM mainframe equipment you will have developed a strong commercial knowledge and become fully conversant in either COBOL, ASSEMBLER and/or PL/1. These skills together with awareness of 370 utilities and a T.P. monitor will enable you to assume the role of senior programmer with the opportunity of team leader responsibility on certain projects.

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Ref. N1/1910

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To £6750

HANTS/SURREY

Our client urgently requires three COBOL and/or PL1 Programmers to complement their project teams developing a variety of systems. Successful applicants will have at least two years' programming experience and will be looking to enhance their careers within a well-respected company.

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The installation is taking delivery of a new mainframe next year and is situated in the attractive stockbroker belt on the Hampshire-Surrey border, easily commutable from the surrounding villages. Relocation expenses are paid, along with additional benefits that combine to provide first-class opportunities.

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Please telephone for a confidential

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30 Fleet Street London EC4Y 1AA

01-353 0981

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* BIG CAREER BENEFITS

- * "Ground floor" entry to exciting new projects using IBM hardware.
- * Small project team environment with exceptional promotion prospects.
- * Full IBM, database (TOTAL) and Teleprocessing training given - Build your experience!
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* BIG COMPANY BENEFITS

- * 5 weeks holiday.
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Our Client:

A profitable major manufacturing company and market leaders in their field, with pleasant offices in the North London suburbs.

The Projects:

A series of exciting new marketing, manufacturing and financial systems using TOTAL database and a VDU network. These will be based on a new 370/138 using DOS/VS, full on-line development facilities and a mini communications processor.

To Apply:

You will need at least one of the following:

- 18 months COBOL programming experience on any mainframe.
- Commercial systems experience at any level from junior to project management.
- Assembly experience (DOS/VS, POWER/VS, CICS knowledge an advantage).

To arrange an informal discussion, clip and coupon or telephone Neil Beckingham at Austin Knight Limited, no further writing will be required.

Austin Knight Ltd

20 Saffron Square, London, W1P 1PS

Telephone 01-479 4881

* Systems Project Leader	to £7.8k
* Systems Analyst	to £6.8k
* Cobol Programmers & Analyst Programmers	to £6.0k
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Position applied for

Name _____ Age _____

Address _____

Phone (home) _____ (work) _____

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THESE ARE THE PEOPLE WE NEED:

Project Leader - Information Systems

c. U.S. \$33,000 p.a.
Preferably a graduate with at least eight years in commercial programming and systems analysis, including two years' supervisory experience. Specific knowledge should include advanced programming techniques (preferably in Assembler language and PL/I), use of file management systems, on-line enquiry systems, advanced database design and data handling techniques, OS/VS/370/MFT/MVT, DASD organisation and access methods. Ref. 983/B/CW.

Project Leaders - Systems Analysts

c. U.S. \$33,000 p.a.
Preferably graduates with a minimum of eight years' experience in commercial programming and sys-

tems analysis, and at least two years' supervisory experience. Should also possess a knowledge of advanced programming techniques (preferably in PL/I), use of file management systems, on-line enquiry systems, advanced database design (preferably IMS/Mark IV) and data handling techniques OS/VS/370/MFT/MVT, DASD organisation and access methods. Ref. 983/A/CW.

Project Leader - Reservoir Systems

c. U.S. \$33,000 p.a.
Should be a graduate in Petroleum Engineering, Chemical Engineering or related Physical science with emphasis on Mathematics. Will have at least eight years' technical

experience in the development and application of numerical simulation models since obtaining degree. A thorough knowledge of programming in Fortran is required. Ref. 983/C/CW.

Senior Systems Analyst

c. U.S. \$30,000 p.a.
Preferably a graduate with a minimum of six years in commercial programming and/or systems analysis, preferably with a large industrial organisation. Some supervisory experience is desirable as is specific knowledge of programming techniques (preferably in COBOL, Assembler and PL/I), use of file management systems and on-line enquiry systems. Should be familiar with advanced database design and data handling techniques, OS/VS/370/MFT/MVT, DASD organisation and access methods. Ref. 983/D/CW.

Please write with full details of age, qualifications, experience and availability (quoting appropriate reference number) to:
Frank Wilcockson,
Whitlock Recruitment Limited,
72 Fleet St., London EC4Y 1JS.

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SYSTEMS ANALYSTS/DESIGNERS

are required by a rapidly expanding Software and Consultancy Organisation based in Bath.

Assignments are varied and interesting with clients throughout the South West of England.

Applicants must have a sound academic background, with a minimum of two years' relevant experience and show initiative and self-motivation. Salaries are in the range £4K-£8K with a productivity bonus scheme which can increase earnings by up to 10%.

If you are looking for a challenging position situated in a lovely part of the country, please write or phone:

W Walker-Weaton Associates Limited
Specialists in Computer Recruitment
Woodlands, Lower Bristol Road, Bath,
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Librarian

The Automobile Association, based at Basingstoke, Hampshire has a vacancy for a Computer Librarian within the Computer Operations Department.

We are looking for a mature person who is capable of running our Computer Media Library. The successful candidate, male or female, will be expected to control a library of 6,500 magnetic tapes by using an automatic tape library system (ATLAS), and 120 disc packs. Additional responsibilities will include file allocation, media evaluation and the supervision of a small team of media librarians.

Conditions of employment are in keeping with a progressive

Please write or telephone for an application form to:

AA

THE AUTOMOBILE ASSOCIATION

Mrs. K. M. Holloway, Head of Personnel, Automobile Association, Fanum House, Basingstoke,
Basingstoke RG21 2EA Tel: Basingstoke (0256) 62971

Micro Computer Systems Sales Engineers

Leigh Instruments (UK) Limited require Sales Engineers to cover expanding markets in the field of specialised and general purpose Micro Computer Systems.

Ideal candidates will possess a well balanced background in Micro based hardware/software and will have the ability to interpret customer requirements and interface with in-house engineering and software specialists.

Attractive salary, company car and usual company benefits.

Applications should be addressed to:-

A. F. Cummins, Managing Director,
Leigh Instruments (UK) Limited,
1 Mount Road, Hanworth, Middlesex TW13 6EY
Telephone: 01-898 3541

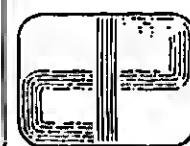
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Acting for clients we seek junior and senior Field Service Engineers for the following vacancies:

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£10,000 tax-free + good fringe package. PDP 11/40 experience essential.
MIDLANDS, £5,500 + car + bonus.
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Ring us regardless of experience.

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Computer Data Processing Limited

Experienced Computer Operators and Control Clerks

Salary £4,400 (inc. shift allowance)

Due to further expansion - which includes the installation of an ICL 2900 mainframe - we require experienced operators and control clerks to join our efficient and hard working Operations Team.

The present configuration consists of two large ICL systems 4/72's, 2H 112360s, 14 MTUs, 4 LPs, 2CR, 30 local VDLs and 4 JILs. Ideally, applicants should have two years' operating or control experience on System 4 or IBM 360/370 machines. Experience on 2900 - either operating or SCL - would also be an advantage. Three shift working (Monday-Friday) is in operation.

Our office is located very close to the main-line station (London 43 minutes and Brighton 15 minutes).

Applications to:
Alan Merion
Operations Manager
COMPUTER DATA PROCESSING LTD.
Oakfield House
Perrywood Road
Haywards Heath, Sussex
Haywards Heath S21 1BB

ipc

ST. BARTHOLOMEW'S HOSPITAL
London EC1A 7BE

Programmer

Applications are invited for a programmer to join the Staff of the Medical Electronics Department to work on a variety of applications of microcomputers in a new laboratory setting. The successful candidate will have a degree in Computer Science or a related subject and will have experience in programming. Salary scale: £3808 to £4775 (plus pension). Please telephone 01-800 8000 ext. 2271-4000 or write to: BCA/271 for an application form and job description.

PLEASE READ ON...

More than 60 people contacted us in response to our recent advertisement headed "PLEASE READ THIS" and in each case a short telephone call enabled us to determine whether our requirements were compatible.

Although we are very pleased with this response there are still a lot more people that we have not heard from yet.

Please get in touch with us - you will not be wasting either your time or ours.

For those people who do not recall seeing our last advert we would like to restate some of the things we said:

"We need a lot more staff to achieve the £4,000,000 of growth planned for this year."

"The Service Industry is different and you either love it or hate it. We love it - perhaps you would."

"We have recently been named as the fifth highest wage payer of the top 1,000 private companies in the UK."

"We require computer professionals with a minimum of 2 years' commercial systems and programming experience. At the top end of our scales we are looking for solid consultancy and management experience as well. We have a wide range of salaries (£5,000 to £12,000) because we have a wide range of requirements."

"We offer a wide variety of challenging work from programming through to consultancy. We work with minis and mainframes and with a variety of customers and applications. All promotion is from within and is based purely on ability. Our commitment to growth ensures excellent promotion opportunities. The CMG atmosphere is both professional and informal and everyone is encouraged to participate in the affairs of the company. There are profit-sharing and share-purchase schemes, as well as many excellent non-contributory benefits."

Please write or telephone for more details. If you prefer to call me in the evening or at the weekend you may do so on 01-657 3798.

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We are working on a number of advanced projects for home and overseas markets. Among the most exciting are several in data network switching and control and a computer controlled wide area traffic scheme for the whole of South East England. These projects utilise the very latest developments in systems technology.

We are offering first class career opportunities to: Group Leaders, Principal Engineers and Programmers with a background in any of the following:
DEC, PDP 11, RSX 11M, Coral Assembler or Fortran.

If you cannot make any of the above visits, please write or telephone Richard Edwards, Technical Recruitment Officer, Plessey Controls Limited, Sopers Lane, Poole, Dorset BH17 7JL. Tel: Poole (0203) 5161 Ext. 3544

Come and talk...
In a very informal setting to some of our engineers and personnel people. We will tell you all about our work and opportunities and all the benefits we can offer you. You will find us between 4pm and 9pm at the following sites:

THE SAXON HOTEL
Southern Way, Harnow
on 24th October

THE CROMWELL HOTEL
High Street, Steventon (Old Town)
on 25th October

CIVIC OFFICE
The Bells Centre, Reading
on 26th October

PLESSEY

Bored?

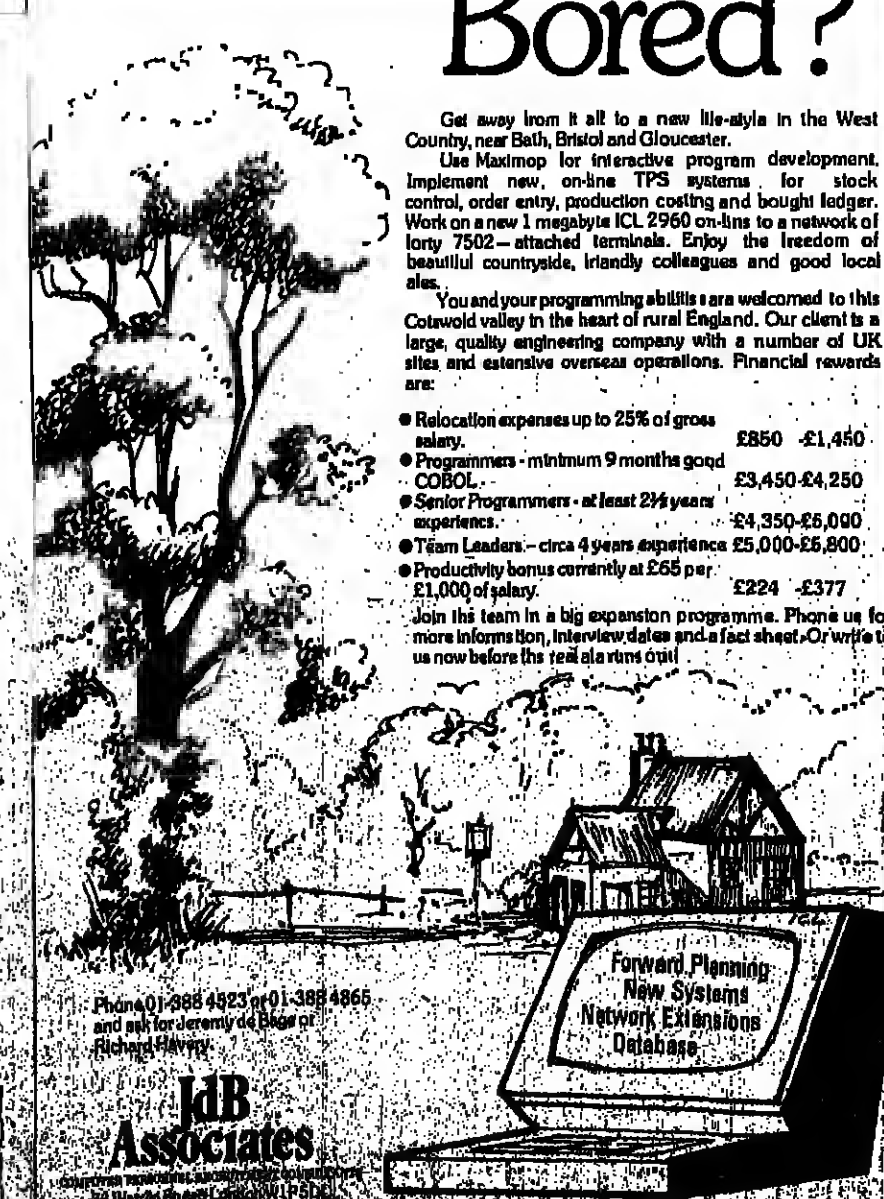
Get away from it all to a new life-style in the West Country, near Bath, Bristol and Gloucester.

Use Maximop for interactive program development. Implement new, on-line TPS systems for stock control, order entry, production costing and bought ledger. Work on a new 1 megabyte ICL 2960 on-line to a network of forty 7502 - attached terminals. Enjoy the freedom of beautiful countryside, friendly colleagues and good local ales.

You and your programming abilities are welcomed to this Cotswold valley in the heart of rural England. Our client is a large, quality engineering company with a number of UK sites and extensive overseas operations. Financial rewards are:

- Relocation expenses up to 25% of gross salary. £850 - £1,450
- Programmers - minimum 9 months good COBOL. £3,450 - £4,250
- Senior Programmers - at least 2 1/2 years experience. £4,350 - £5,000
- Team Leaders - circa 4 years experience. £5,000 - £5,800
- Productivity bonus currently at £65 per £1,000 of salary. £224 - £377

Join this team in a big expansion programme. Phone us for more information, interview date and a fact sheet. Or write to us now before the real life starts!



Phone 01-888 4823 or 01-388 4865 and ask for Jeremy de Bage or Richard Harvey

JB Associates



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A sound experience of DOS/VS operating systems together with knowledge of POWER, ASSEMBLER and CICS for a Bank installation, IBM 370, City E.C.2. Ref: 304

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Very good experience of analysis, plus knowledge of COBOL/PL/I, for the development and commercial applications with a leading construction company, North London. Ref: 321

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Experience of DOS and/or OS JCL, IBM 370, POWER/VS, previous control experience and a ability to work on own initiative. Days only, some travel abroad. London S.W.1. Ref: 322


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An operator with up to 2 years' Systems 3/10 or 15 experience, with knowledge of CDP/DDL. Single shifts 2-8. Excellent banking benefits. City E.C.2. Ref: 317

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Computing Services Association
Agency Licence SE(A)3345



Metropolitan Borough of Rochdale

Treasurer's Department

PROGRAMMER (Computer Section)
AP.4/5 42425/15073

Rochdale is situated 12 miles north of Manchester on the edge of open moorland. An I.C.L. 2980 system has recently been delivered and the machine and staff are housed in purpose designed accommodation in new municipal offices. The successful candidate will be one of a team of five programmers engaged in continuing development and maintenance work and the preparation of existing work for the 2980 installation. Knowledge of Cobol Plan and Communications systems will be an added advantage. Assistance with removal expenses and housing accommodation may be available in appropriate cases. Further details may be obtained by ringing Rochdale 69308 (Mr. Wright). Application forms available (by quoting Ref. No. C84) from the Chief Personnel Officer, 186 Drake Street, Rochdale OL16 1XG, to whom they should be returned by 2nd November, 1978.

London, H.Counties
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Main-Frame & Minis
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IMS DB/DC
London, Holland & Germany
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Ref:30/C

ICL 1900 & New Range
Thames Valley & London
£5.5-8,000
Ref:30/D

A London based client with regional offices in several Home Counties locations has retained Logistix to aid in recruiting up to 12 Mini or Micro computer specialists with 18 months or more practical applications or software development/design experience in either a computer manufacturing or Software Systems House environment. If you have relevant experience we invite you to discuss your career advancement prospects with our client at your earliest convenience in an informal atmosphere.

Those who have Assembler or Basic language experience on Mini or Micro hardware particularly DEC PDP 11, D.G. Nova/Eclipse & T.I. 900/9900 or Micro processors preferably Intel 8080/5, Zilog 280 or Motorola 6800 will be ideally suited. In addition to above-market starting salaries our client offers excellent career advancement prospects and the opportunity to travel within Western Europe. We would like to hear from interested applicants as soon as possible with a view to arranging an early interview. Salaries will be in the range £6-8,500.

A very prestige client with Headquarters in London and regional offices located in Cheshire and throughout Europe urgently requires the following: Real-time & On-Line programmers & Systems Designers, Database & Compiler specialists with 2-5 years solid experience. Of particular interest would be people with relevant experience in one or more of the following: DEC with either BASIC, RTL, II or CORAL, IBM or ICL with COBOL, Assembler or PL/I. Also Ferranti Argus or IMS or Database design specialties are welcome. The scope of projects is both broad and demanding and certainly in keeping with the prestige of this client. You will play an important role in project development and will be given considerable autonomy in developing your technical expertise and enhancing your contribution to the work of this reputable group of which you will be more than proud to be a member. Logistix have been given a brief to pre-select suitable personnel and to recommend Salary grades in line with our experience of prevailing market levels. We anticipate Salaries of between £5 and 7K being accepted. Of importance is a speedy response as our clients are anxious to make offers of appointment.

An international client with offices in London and Europe is entering another major expansion phase for which they require additional IMS expertise including Project Leaders, Systems Designers, Analysts and Senior Programmers; the latter should be skilled in either PL/I, COBOL, Assembler or Mark IV. Both Database and Data Communications experience would be welcome. Applications are varied but include Banking systems, Airline booking and Stock control. Not less than two years relevant experience will be considered and for more senior positions 4 years is the minimum. U.K. based personnel may have frequent opportunity to travel to Europe and the U.S. (if desired). Europe based personnel are given very generous expenses and live in not paid trips back to the U.K. Salaries need to be in line with the client's prestige and the importance which they place on the acquisition of these key personnel. We have our Client's assurance that interviews will be held without delay as soon as resumes are received. You will be interviewed either in London or flown out for the day to Amsterdam or Frankfurt.

An important client of International repute with offices in the Thames Valley & London requires, due to further growth, the following permanent or long contract personnel: Consultants, Analysts, Systems Designers & Programmers to join new and existing project teams for work on a variety of commercial systems involving T.P. and Database expertise. Prior experience of the former is desirable but not essential. Of significant importance is solid grounding in one or hopefully more ICL programming languages or On-Line skills. Successful candidates will have either New Range or 2900 Main-frame or 1900 hardware backgrounds under either DME, VME or GEORGE. Conversion 1900-2900 experience would be especially welcome as would be any Communications background. In addition to very competitive salaries full relocation expenses are provided, if applicable, and an impressive package of fringe benefits accompany these offers. Interviews will be held as soon as applications are received and offers made to successful candidates within 7 days. All interview expenses will, of course, be Client paid.

Database designers and applications programmers with either IMS, TOTAL, ADABAS etc to be based in Europe or West of London. Salary £8-16K plus big company benefits.

Oil Company based in Central London urgently requires IMS DB/DC Analysts, Database designers & Applications programmers. Salaries dependant on grade £8-12K.

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Univac 1100 programmers, analysts & Systems Designers for Frankfurt, Copenhagen and U.S. based clients. Exec 8 & FORTRAN are pre-requisites. Salary £12-16K.

PDP-11 Specialists — one of the principal OEM suppliers of DEC systems based in the Thames Valley are offering senior RSX-11M or RSTS personnel exiting career opportunities at very tempting salaries up to 10K.

Hardware Engineers (Minis) with a desire to work on long term contract in Germany or France at circa £400 p.w. (tax free). A pre-requisite is experience of 32 or 16 bit minis or Wang/CDC type disk drives.


Mini Consultants, Analysts & Programmers for the Dutch division of a Major U.K. group required with software or technical backgrounds. Salaries £10-16K.

CORAL 66 systems designer for G-9 minis contract in Dorset. Rate circa £300 p.w. Familiarity with PDP 11 would be advantageous but not essential. Software or technical background is desirable.

COBOL or PL/I programmers are required by a City Institution. IBM OS is preferred but DOS considered. Two years min. experience essential. Salary: From £5.5-7K plus 25% mortgage subsidy & other fringe benefits.

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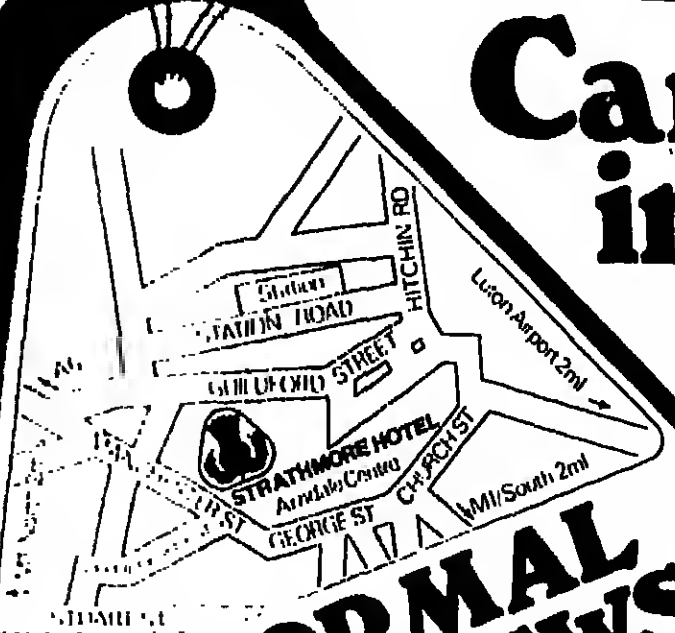
UNIVERSITY OF ESSEX
TEMPORARY LECTURER
in the Department of Electrical Engineering Science

Applications are invited for a post of Temporary Lecturer (salary scale £3,893-£7,754) in the above Department for appointment not later than 1 December, 1978. Candidates should have a relevant degree and experience in telecommunications or computer systems, with special interest in software engineering or telecommunications software. Applications (three copies), including a curriculum vitae and the names and addresses of two referees, should reach the Registrar (AS/ST/DW), University of Essex, Wivenhoe Park, Colchester CO4 3SD, from whom further particulars may be obtained by November 2nd, 1978.

Zimmer
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SYSTEMS ANALYST/PROGRAMMER

This position offers an opportunity to join a dynamic and exciting Data Processing Department. The successful candidate will be aged between 26 and 45, will report to the Data Processing Manager and should have experience in commercial systems, a knowledge of R.S.T.S. is essential. The position involves basic plus programming working on a Digital P.D.P. 11/40 computer. An attractive commensurate salary will be paid commensurate with qualifications and experience. Conditions of employment: air good, and holiday contributory pension scheme, staff development bonus, sick pay scheme and 25 days holiday per annum. Apply in writing with full C.V. to: Group Personnel Manager, Zimmer Orthopaedic Ltd., Industrial Estate, Bridge Road, New Glen SP4 3PT.



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Systems Analysts


To work in application areas and database administration on several major new development projects. Some previous IMS experience an advantage but full training will be given to suitable candidates.



INFORMAL INTERVIEWS

Strathmore Hotel

Arndale Centre Luton Beds.
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Saturday 28th October 9am to 1pm



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You will be responsible for final test, debug and verification of Amdahl computer systems. The performance of these tasks involves the use and full knowledge of large scale data processing systems and high speed measurement techniques. Your background should include experience with final test or field maintenance of medium or large scale computers or S/370 compatible peripheral controllers. College graduates with electrical engineering qualifications emphasizing digital logic design are encouraged to apply.


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You will be responsible for the organisation and direction of maintenance, construction and utility services to the plant. This involves preparation of capital order requests for major equipment, co-ordination of the construction of the proposed new manufacturing facility and the introduction of planned preventative maintenance systems. Your background should include at least 5 years plant/facilities engineering in a manufacturing environment and a degree or equivalent qualification in mechanical or electrical engineering.

Salaries and conditions of employment for these positions will be attractive. Assistance with relocation expenses will be payable. Applications in writing or telephone for Application Form to: **The Personnel Director, Amdahl Ireland Limited, 140/141 Slaney Close, Dublin Industrial Estate, Dublin 11. Telephone (01) 307966**

Training for these positions will be carried out at the Amdahl headquarters at Sunnyvale, California.





SYSTEMS ANALYSTS TO £7750

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WEST OF LONDON

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ANYTIME

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The Senior Systems Analyst is to act as a Project Leader and should have at least five years system design/analysis experience. Those with experience of financial and production applications will have an advantage. Age around 25/35. Salary £20,000 pa.

The Analyst/Programmer is to be a member of a project team and initially will be the Senior Programmer. Two years' experience of COBOL is essential. FORTRAN is desirable. Age around 22/28. Salary £16,000 pa.

In addition to the salaries mentioned above, the total remuneration package includes relocation costs to Australia for applicants and their families. Preliminary interviews are to be held in UK from about 13 November and final interviews in London from 20 November 1978.

Candidates, male or female, should write for a personal history form and further details, quoting reference MCS/5020 (Senior Systems Analyst) or MCS/5021 (Analyst/Programmer), to Roland Orr, Executive Selection Division, Southwark Towers, 32 London Bridge Street, London SE1 9SY.

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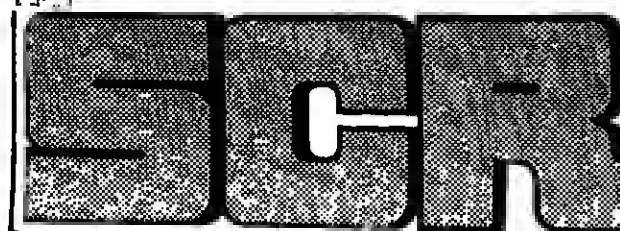
You should have:

A minimum of two years' successful selling experience in a computer or business related discipline.

For further information about these positions contact Advising Consultant:
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For application form and further details write to Graphical Software Limited, 5 Salisbury Villas, Station Road, Cranbridge, or telephone Michael Eatherton, 0223 88111 or 0223 88300 9 to 5 p.m. and after 6.30 p.m.

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Applications are invited from men and women for a post of PROGRAMMER in the University Computing Service. The work will involve the writing of programs and provision of program assistance for computer users throughout the University. The post might suit a recent graduate in Computer Science or a related subject. Candidates should have an interest in programming in a high level language, and a willingness to specialise in an area such as data bases, graphics, simulation or scientific programming. Salary according to qualifications and experience on the Other-Related Staff Grade 18 salary scale £3384-£4882. Particulars from the Registrar and Secretary, The University, Sheffield S10 2TN to whom applications should be sent by 30 October, 1978.

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A very experienced Analyst/Programmer with approximately three to five years' design/programming experience in RPGII and COBOL is required to assist in the design and development of business and engineering systems to be implemented on client sites in the Middle East on both System 3 and ICL 2903 mainframes.

The successful applicant will be expected to:

- Perform feasibility and system design studies
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- Assist in developing time and cost estimates for systems and programming and develop and maintain programming standards and controls
- Be available for limited travel to the Middle East.

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To be responsible for the development of new computer programmes plus the maintenance and enhancement of existing systems.

It will involve the analysis of user requirements for small projects and candidates should have three years' COBOL programming experience together with experience on IBM 360 or 370.

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To work with Remote Batch Terminals connected to San Francisco computers and UK computer terminals. Appropriate training will be provided.

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Joint Computer Installation

Systems Analyst \$1

Salary on scale £517-£5853 p.a. incl.

A systems analyst with two or three years' experience is required to help with the development of new systems on an IBM 370/145 based at Acton Town Hall.

Emphasis is now being placed on the development of teleprocessing systems.

A 35-hour flexible working week is in operation. Benefits include interest free loans for season tickets and payment of removal and settling-in expenses in approved cases.

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Salary £3662-£3994

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Benefits include paid overtime, 15 days' holiday, interest-free loans for season tickets.

The joint computer installation is an expanding operation providing teleprocessing and data base facilities for a wide variety of users for two of London's largest boroughs.

Application forms from Personnel Office, Room 2402, Town Hall Annex, Ealing W5 2BY. Tel: 01-876 2424.

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Candidates will have four years' programming experience, minimum, including a significant period at a senior level and against a commercial or production background. They should be prepared to stay on a "bachelor" basis in Bahrain for one year with a mutually agreed extension if necessary.

Further information from and applications to:

Alan Barker
CAPABILITY SERVICES
11 Coggeshall Road, Braintree, Essex
Telephone: Braintree 28828

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Opportunities at various levels exist to join the Operating Team of an expanding organisation.

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Applicants must be over 18 years of age, and should possess GCE 'O' levels, preferably 'A' levels, together with at least one year's operating experience in a large computer installation.

The salaries for these positions will be dependent upon experience and will be within the following range, subject to review: £2,874-£3,750 per annum, plus shift allowance.

Applications should be addressed to



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0744 71281

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Computer Personnel Consultants

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Processing will be based on DEC PDP11 real-time machines. The current IBM 370/138 is due to be phased out in the future. An operations team of fifteen controls the running of these machines and an Operations Supervisor is currently required who will play a significant role in the success of this major development.

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Please write, with details of experience to date to Mr D. Kings, DP Manager, Everest Double Glazing, Everest House, Cuffley, Potters Bar, Herts.

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Copenhagen — Univac/Assembler Specialist 1 year
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POSITION	SALARY	EMPLOYER	LOCATION	HARDWARE ENVIRONMENT	SOME OF THE QUALIFICATIONS	REF. NO.
PROGRAMMERS	To £6,400 + bonus + ++	SANKINS	E. LONDON	IBM OS	Opportunities for programmers with 18 mths + experience (preferably PL/1) to work on the development of advanced systems using CICS & Mink.	42/1
ST/ANALYST	To £15,000	SOFTWARE SERVICES	HOLLAND	MINIS/MICRO	Excellent opportunities for D.P. professionals with in-depth experience of Min/Micro software or on-line, real-time or message switching to work on exciting projects.	42/2
PROGRAMMERS/ANALYSTS	To £8,000 + Morg. sub.	FINANCIAL ORGANISATION	HERTS.	IBM	Programmers with 2 yrs. + COBOL, Assembler or PL/1 urgently required to join this expanding D.P. department using on-line facilities with CICS.	42/3
CUSTOMER SUPPORT ANALYSTS	To £8,000 +	MANUFACTURER	LONDON	MINIS/VRC's	Unusual opportunities for programmers with a Min/VBC background and commercial experience to be involved in design/installation and support of clients' systems.	42/4
PROJECT LEADERS/ANALYSTS/PROGRAMMERS	c £7,500	SOFTWARE HOUSE/BUREAU	BERKS.	ANY	Excellent prospects for all levels of staff with a general commercial background and preferably assembler level programming to join this new division of a well established organisation.	42/5
RPG II/COBOL PROGRAMMERS	To £6,500	CONSTRUCTION INDUSTRY	S.W. LONDON	IBM OS/US	Unusual opportunities available for programmers with 2 yrs. + COBOL or RPG II to work on engineering projects in this rapidly expanding organisation.	42/6
TECHNICAL/SCIENTIFIC PROGRAMMERS	To £7,000 +	TECHNICAL CONSULTANCY	LONDON + S.E.	MINIS/MICRO	Varied and exciting development projects available for scientific programmers with 2 yrs. + Assembler/Fortran/COBOL experience.	42/7
CONSULTANT ANALYST/PROGRAMMERS	A.1 neg.	SOFTWARE HOUSE	GERMANY	IBM OS	One year contract available for D.P. professionals with in-depth knowledge of OS software and Assembler/PL/1 or SPL for challenging development projects.	42/8
TECHNICAL SUPPORT STAFF	To £8,500 + bonus + car	MANUFACTURER	LONDON + TRAVEL	ANY	Excellent opportunities for Analysts/Programmers with 2 yrs. + experience in R/T, Comms/Banking/Accounting to evaluate and develop applications and systems in an expanding environment.	42/9
PROGRAMMERS	To £7,000	FINANCIAL SERVICES	CITY	IBM OS	Excellent career opportunities for PL/1/Assembler programmers with 2 yrs. + experience to work on a wide variety of projects in a real-time/TP environment.	42/10
SOFTWARE DESIGNERS	To £9,000	MANUFACTURER	BERKS	ANY	Excellent opportunities for experienced software staff in the fields of comm. D/S, Assemblers, etc., to work on the development through to implementation of products.	42/11
SYSTEMS/DEVELOPMENT PROGRAMMERS	To £8,000 in UK	SERVICE INDUSTRY	LONDON/HOME COUNTIES/BRUXELLES	IBM OS	IBM DOS ASSEMBLER programmers urgently required to work in a challenging and rewarding developing/maintaining software products.	42/12
SYSTEMS ANALYSTS	To £7,500	SOFTWARE HOUSE	W.C.1	MAINFRAME/MINIS	This progressive Software House urgently requires Analysts with a minimum of 1 yr. + experience to work on various commercial applications.	42/13
ANALYSTS & PROGRAMMERS	To £10,000 TAX FREE + ACCOM.	BUREAU	BAUWI ABANDIA	IBM OS	Analysts with DB/TP experience and programmers with COBOL urgently required for 1 yr. renewable contracts. Interviews will be arranged in London.	42/14
PROGRAMMERS	To £5,500	PROFESSIONAL SERVICES	S.E. LONDON	POP 11's RST	Programmers with 1 yr. + experience of BASIC + to work on development projects in an on-line environment urgently required. Opportunities to work on Micro and word processing systems.	42/15
ANALYSTS/PROGRAMMERS	To £7,500 + bonus	INSURANCE/FINANCE	CITY	IBM OS	Analyst/Programmers required preferably with a PL/1 background to join this expanding organisation using IMS, CICS, to maintain and enhance production systems.	42/16
BANKING CONSULTANCY	A.1 neg.	BUSINESS SERVICES	E.E.C.	ANY	Unusual and challenging 1 yr. renewable contract for high flying consultant with banking experience. Excellent prospects for the right candidate.	42/17
PROJECT LEADERS	c £7,000 +	CHEMICAL INDUSTRY	MIDDX.	IBM OS	First-class opportunities for commercial analysts with 3 yrs. + experience and knowledge of COBOL to develop new systems in an on-line database environment.	42/18
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SENIOR CONSULTANTS	To £10,000 +	CONSULTANCY SERVICES	LONDON & S.E.	ANY	Opportunities for D.P. professionals. Preferably with previous consultancy and management experience to join an expanding consultancy organisation.	42/21
ANALYSTS/COBOL PROGRAMMERS	To £7,000	MANUFACTURING	HERTS	IBM	Excellent career opportunities for ambitious D.P. professionals capable of working in a challenging environment.	42/22
ANALYSTS/CONSULTANTS	c £7,000 +	CONSULTANCY SERVICES	LONDON	ANY	First-class opportunities for Analysts who have developed and implemented successful systems in their well established international organisations.	42/23

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At least one year's Systems experience is required, including the implementation of a major system with programming experience preferably in Cobol.

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Ring Ian Carter for further details on
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Due to the success of our recent Operations recruitment campaign, our client, THE WELLCOME FOUNDATION, has decided to further enhance their team to cope with the development of computer operations within the group. This development follows the successful introduction of 2x IBM 370/148s with the operating systems and IMS under the control of OS/VS1 and VM 370. Extensive communications equipment includes local and remote VDU's, typewriter terminals and RJE facilities throughout the U.K. It is a highly sophisticated operation certainly one of the most advanced in the country.

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Applications are invited for the above post for the Department of Science and Computing. The successful applicant will be required to maintain and develop program for the use of the Institute of Education. The post is a full-time position and the successful applicant will be required to maintain and develop program for the use of the Institute of Education. The post is a full-time position and the successful applicant will be required to maintain and develop program for the use of the Institute of Education.

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SDI, the world's largest independent supplier of computer systems software, is out to identify the top four Assembler Programmers in Britain. Start this test of your skills and knowledge by taking part in this quiz compiled by SDI experts at our IBM equipped Research and Development Centre at High Wycombe. It is not easy — but the extent of your knowledge could surprise you — and only the best can become one of the four ultimate winners.

QUIZ DETAILS

The quiz is in two parts. Part 2 will be used as a "tie-breaker" if more than four people have top marks for Part 1. The criteria on which Part 2 will be judged are speed of execution on SDI's IBM 370, economy of code and maintainability. Answer the questions to Part 1, complete the details requested and post this page, together with your code for Part 2, to SDI, PO Box 84, High Wycombe, Bucks, to arrive not later than Monday, 30th October, 1978. The winners will be announced in this publication on the 10th November, 1978.

QUIZ

Part 1

a) How would you obtain the address of a partition's own communication region?

b) In what order is the Label Information Cylinder searched by the standard DOS or OOS/VS open routines?

c) An entry is deleted from the channel queue at the time the supervisor executes a SID for the relevant CC8. True or False? (Please give reasons)

d) CSECT1 CSECT 12,0
GALR USING *.12
LA 2,3
XL 9E LABEL2
EX 2,LA9EL3
GALR 3,0
9CT 2,LA9EL1
LA9EL2 EOJ
LA9EL3 CL LA9EL3+1,4

i) What does general register 2 contain at EOJ?

ii) What does general register 3 contain at EOJ?

iii) What does the instruction at LABEL1 look like in object form at EOJ?

iv) What other instructions have been modified during execution of the above code?

a) What would be the effect of attempting to execute the following instruction RDD D,1

a) The first instruction of a problem program running under DOS on an IBM 360 CPU with the direct control feature installed.

b) The first instruction of a logical transient loaded into the logical transient area by a problem program running under DOS on an IBM 360 CPU with the direct control feature installed.

c) The first instruction on a problem program running under DOS/VS on an IBM 370 CPU with the direct control feature installed.

d) The first instruction of a logical transient loaded into the logical transient area by a problem program running under DOS/VS on an IBM 370 CPU with the direct control feature installed.

Part 2

Write a sub-routine that will reverse the order of the bits in a byte. The sub-routine is to be called using standard IBM calling conventions. The address list passed by the calling program will contain one entry which is the address of the target byte. The sub-routine is to be written using IBM Assembler Language and should be capable of executing under OOS on an IBM 360 or DOS/VS on an IBM 370. The size of the sub-routine must not exceed 100 bytes. The code must allow for any value to be contained in the byte whose bits are to be reversed.

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The SDI Software Awards signal, we believe, just one way in which we can put something back into the industry.

We felt that it ought to be a challenge. The harder it gets — the brighter the future for us all.

If you are interested in working for SDI or would like to know more about the company and the current vacancies, please Ron Johnson, Development Programming Manager, on High Wycombe (0494) 20947.

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0352 7575/76/2472

UNIVERSITY OF SUSSEX PROGRAMMER

To work in the Arts and Social Studies Research Support Unit working on an ad hoc basis. Applications are invited from experienced programmers to work on a small unit performing statistical analysis. The successful applicant will be required to maintain and develop program for the use of the Institute of Education. The post is a full-time position and the successful applicant will be required to maintain and develop program for the use of the Institute of Education.

The salary will be on the top scale of £5,000 per annum. £5,000-£5,500 per annum. £5,500-£6,000 per annum. Higher duties and applications should be sent to the Office of the County Treasurer, County Hall, Exeter, Devon, EX1 1AA. Tel: 0352 7575/76/2472.

WEST SUSSEX COUNTY COUNCIL County Surveyor's Department

Analyst/Programmer Transportation, Post No. 89

Salary Scale £4,920 to £5,595 inclusive. Required to co-ordinate the computing efforts of Engineers and Technicians in the Transportation work of the Department. Candidates should hold a suitable degree and/or experience of FORTRAN and IBM O/S, and some knowledge of Transportation Planning would be an advantage.

We have an IBM 370/156 which is being replaced next year by two machines: an IBM 3091 with MVS and TSO, and a large mini-computer with graphics terminals. The successful applicant will be required to maintain and develop program for the use of the Institute of Education. The post is a full-time position and the successful applicant will be required to maintain and develop program for the use of the Institute of Education.

THE SALES BIT

The user must understand disciplines

SO there I was, having experienced the dubious pleasures of a 5.30 am breakfast and the completion of a 180-mile journey before 9.00 am, strolling through Hyde Park in the hope of finding the entrance tent for the Sunday Times "Fun Run".

Despite the encouragement of a beautiful early autumn morning I found it hard to be exhilarated by the sight of what must have been the entire population of ICL jogging around in company tee-shirts, to say little of Datskill and numerous other computer industry types.

Well, I mean, really — there I was spending my weekend trying to escape from the computer business! Having recovered from the initial shock I soon received another. There stretched before me was an enormous and apparently static queue of jolly gentlemen waiting to collect their numbers for an event which was soon to start on the opposite side of the park.

The conversation drew to its inevitable conclusion. "Of course it's a bloody shame, they're using a computer." I guess I have been drawn into that particular verbal vortex too many times to want to make the

Journey again. Sunday is not really the day for discussions on "Garbage in, garbage out" and the importance of efficient data entry systems. Slowly but surely, and almost too late to get to the start, we edged towards the door of the entry control.

It is at this point, I should mention, that runners could collect their numbers any time within two hours of the start of their particular event, and therefore the queue could involve as many as 5,000 people at a given time.

The design of the data entry system was remarkable. The input device was a "garden-fete" machine with a single door about ten feet across through which participants had both to enter and exit — over 11,000 in all.

I leave the rest to your imagination. Frayed tempers, mild hysteria, crude derision and more than a little jostling. Why not enter at one end and exit at the other? Too simple, perhaps!

Meanwhile, back at the ICL computer centre, close to the finishing line, a well presented and organised computer operation prepared itself to provide prompt and meaningful information. I don't know whether they actually received all the input they required, but if they did, it was certainly not in the form they had originally anticipated (they were working under a handicap right from the start).

I have seen this kind of situation so many times before, where the efficiency of computer systems has been degraded simply because the user does not appreciate the need for discipline matched by efficient systems that are simple in conception and practical in application based on methods which have been thought through and tried out on a dry-run basis.

To compute inefficiency is to compound it. Salesmen and systems analysts alike must constantly be aware of their responsibility to ensure that the user truly understands the value he has to play in the effective application of a computer-based solution. There must be a complete understanding of the disciplines involved and the need for order and consistency.

It is one thing for a user to view the computer solution as a "black-box", but this attitude must not be allowed to overspill into data validity, systems control and management responsibility.

For example, there are far easier ways of explaining cost-volume-profit relationships than the student text book approach of comparing accountants' and economists' models. The standard diagrams used are useful for examination fodder, but have little use in a practical business setting. However, the book offers a lot of sound practical advice and would be a useful reference text for accountants and systems analysts concerned with systems development.

Paul Norkett

TRADER

Puzzle answer

A BATCH of 27 coins is the largest that can be catered for. One method of identification is: Put one coin aside, and label the others A to Z. Then weigh (A+A) in the left hand pan against (A+B) in the right. (2) AB: CJKLSTU against VDE. FGHNOVWX and YXAB. GIMPLYV against SCD. KNOPTWZ. Analysis of the three results will identify the coin.

PAUL NORKETT

South East Thames
Regional Health Authority

Systems Analyst/ Programmer

(£5,313-£6,379 incl. London Weighting)

We are looking for someone with a programming background interested in gaining experience in systems analysis to take over responsibility for our developing Manpower Planning system. The successful candidate would report to the Payroll Project Team Leader but would have wide scope for using his own initiative in developing the system.

Hardware consists of 180k ICL 1904S with a communications processor, EOS 80s, fast magnetic tape, etc.

Programmer

(£4,775-£5,535 incl. London Weighting)

We require a programmer to join a project team developing on-line systems for Hospital Management. The first phase of a patient registration system has been implemented in one site on a 2804 using T.P.S. software.

This post offers an ideal opportunity for someone with sound COBOL experience to move into on-line programming.

The Project Team is based at King's College Hospital, Denmark Hill, which is easily accessible for public transport and has car parking facilities available.

The Computer Centre is situated in the grounds of Lambeth Hospital close to the Elephant and Castle. It is easily accessible by public transport and has car parking facilities available.

For an application form, telephone or write to: Regional Computer Services Officer, South East Thames Regional Health Authority, Regional Computer Centre, Brook Drive, London SE11 4TH. Tel: 01-738 0071 ext. 35.

COMPUTER UNIT

Analyst/ Programmer

Water Industry Grade 7
Salary up to £6084 per year

The Southern Water Authority, whose Computer Unit is located at Brighton, is responsible for all aspects of water management in the South East of England.

The Systems and Programming Department is involved in the development of systems in financial and technical application areas. These range from integrated financial management information and billing systems to engineering applications and the archiving and analysis of water data.

The Authority's workload is now being transferred from ICL 1800 equipment to an ICL 2900 with an extensive communications network. The short term development plan includes both conversion projects and new application projects.

This is an excellent opportunity for a person with some 1800 or 2900 System design experience to broaden their horizons in a modern and varied environment.

Application forms and job descriptions obtainable from the Director of Administration, Anston House, 137/9 Preston Road, Brighton BN1 8AF.

Closing date 7/11/78.

Southern Water



Software Working Managers in Financial Industry

An American consulting firm specialising in EDP software for the financial industry seeks several mature, experienced, highly qualified working managers for projects in London.

Substantial expansion contemplated will provide unlimited personal potential on challenging assignments.

Starting salary offered will be fully commensurate with qualifications and experience.

Interviews will be conducted in London starting 1st November, so immediate responses are called for.

Please apply with full details of education training, experience and qualifications and quote reference 937. Applications will be forwarded to our client unopened and subsequently matters will be dealt with in strictest confidence.

Charles Barker-Coulthard
31 Faringdon Street, London EC4A 4EA.
Telephone 01-236 0526

Contract Programmers/Analysts

If you are thinking of doing contract work why not alert here by registering now for immediate and forthcoming requirements.

For further details contact Bridget Kitchie.

RENDECK LIMITED
100 New Bond Street
London W1Y 9LF
Tel: 01-629 6438



SENIOR PROGRAMMER BUSHEY, HERTS.

Godfrey Davis (Car Hire Ltd.) market leaders in the UK vehicle rental industry, wishes to recruit a Senior Programmer, experienced in COBOL and in programming financial applications, with a working knowledge of NEAT/3.

The successful applicant will be responsible for computing details of our brand new Head Office in Bushey, Herts. (Chesham or the will be required to work in our Head Office at Chesham House until the new premises are ready to move in.

Along with a good salary, there are attractive company benefits including non-contributory pension scheme and free life insurance.

For an application form, telephone or write to: Godfrey Davis (Car Hire Ltd.), 100 Chesham House, Chesham, Bucks. HP8 3JH. Tel: 0494 2222.

Operations Vacancies

London SW1

Phillips Petroleum Company is a major international oil company with worldwide interests in the exploration and production of oil, natural gas and chemicals.

Our Central London Computer Installation, close to Victoria Station, is at present based on an IBM 370/158 processor using OS/VS1. Early in 1979 this will be upgraded to a 3031 and it is planned to install a second 3031 and convert to the MVS operating system. A telecommunications network is an integral part of the system which serves both local and remote users around the globe. Our continued expansion has resulted in the following vacancies within the Operations Group.

Telecommunications Network Controller

A new position reflecting the increasing importance of our telecommunications network. You will be totally responsible for all aspects of the on-line system from an operational point of view including liaison with users and the system software and telecommunications group. You will also be involved in identifying VDU and line problems, making any necessary arrangements for alternative facilities and organising backup and recovery procedures to ensure speedy systems restoration.

We are looking for someone who is methodical with 4-5 years operations experience and a comprehensive knowledge of telecommunications facilities.

Computer Operators

We have vacancies for 2 operators and are looking for people with one to four years experience of IBM 370's under OS. You will join a team operating the machine 365 days a year based on a 12 hour shift system interspersed with at least one week in a very 9 working normal office hours with a generous time-off allowance.

Production Controller

Expansion in our Data Control Group has resulted in an additional position for a production controller with at least 2 years relevant experience in an IBM environment, ideally with a knowledge of JCL.

Duties will include running of production work to schedule and distribution of output to users. Our Data Control Group works an alternating 2 shift system which spans the hours 7.30 am to 9.30 pm Monday to Friday.

We offer excellent salaries and benefits, including pension scheme, free life assurance, sick pay, interest free season ticket loan, etc.

If you are interested in making a career with an international company in a growth industry, then contact:

Phillip Peters, Recruitment Officer,
Phillips Petroleum Company Europe-Africa,
Portland House, Stag Place, London,
SW1E 5DA. For an application form, telephone 01-828 8708 or use our 24 hour answering service on 01-828 2893. Please quote ref: P146.



INTERNATIONAL VACANCIES

SALES ENGINEERS SYSTEMS ANALYSTS

Increased demand for our products overseas has led to vacancies in our Distributors' organisations, mainly in the Middle East. These Distributors are entirely independent from us but they have asked us to help them with recruitment of experienced Computer Sales Engineers and Systems Analysts.

Suitable applicants should telephone (reversing charges):
Hemel Hempstead 612 266 and ask for Mick Burton
or you can write to him at the following address:

CMC Computer Machinery Company Limited
Maxted Close, Hemel Hempstead, Hertfordshire HP2 7LA
Telephone 0442 61266. Telex 825629: Cables Compucor Hemel

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All classified copy should reach our offices no later than 5.30 p.m. on the Monday preceding Thursday's publication. If complete artwork is supplied 12 noon on a Tuesday.
Ring Ian Carter for further details on 01-25 8018

Ascii through the Logic Gate

An epic in 32k words, by Richard Forsyth

Block 18 (Unblocked)

After the brilliant debut has fallen to his death, Hex and Cleo waste precious time in a blazing row. Meanwhile, in the crater and elsewhere, things are heating up.

HEY now the air was thick with sulphurous fumes. The geyser had died down, but in its place had come earth tremors recurring every few minutes. Even if Hex had possessed a rope it was clear that he could never have climbed down into the crater to get back the black box and hoped to return alive. It was high time to depart.

Their next objective was Spruckel's Hole where they intended to take the decadent androids' eulogistic acid and use it to spread chaos over the Network. For safety, they split into two groups and that meant, the way feelings were running, Hex and Ascii in one and Cleo, Lambda and Zap in the other.

They set off down the hill, Hex and Ascii taking a more easterly route. Soon their two paths diverged.

As they walked, Cleo pondered. After about an hour's travelling she asked Zap: "What was so special about that black box? Was it really going to revolutionise the world?"

"Well, I think Hex was over-selling it a bit; but it did have some remarkable features, especially in the area of concurrent processing."

"Concurrent processing?"

"Yes, I mean we've all heard of shared file access," he replied (Cleo hadn't but she didn't contradict him) "and we know all about on-routines, time sharing, multi-threading and so on, but the M5 took it a stage further. When we were tied up to that thing we weren't just exchanging information, we were sharing experiences. I don't mean DMA either," he added.

"I'm so glad you don't mean DMA," said Cleo. DMA meant nothing to her.

"DMA stands for direct memory access," explained Lambda. "Zap's point is that it was more than simply a memory-to-memory transfer."

"It certainly was," he went on. "Our consciousnesses actually interpenetrated. An idea that started in one mind would be developed by another. It's not the kind of experience you forget in a hurry. That's why we freaked out."



"And that's why Hex got so steamed up about it," put in Lambda.

"Yeah," mused Zap. "I remember when Igor Glogoski came to lecture to us. He said that Calculo Ergo Sum (I think, therefore I am) was the ultimate ego-trip; and he was right. The irrefutable existence of other minds as raw sense-data — it's a bit hard to take. A thing like that could blow the System wide open. It wouldn't fit the conceptual framework. The whole edifice would crumble of its own accord. All you'd need to do would be to hook a few of those machines on the Network and leave the automata to draw their own conclusions."

"You mean the System is too rigidly centralized to withstand distributed intelligence?" asked Cleo, with her tongue pressing only lightly against her cheek. The jargon was catching.

"Something like that," he responded. "The M5 was heterarchically organized around a matrix of holonic processors with bioelectric memories. According to all that I've read, holonic processors are theoretically impossible, and the same goes for bioelectric memory; yet we've just had a demonstration. I suspect the System has huddled

it up because it endangers orderly functioning."

"A holonic processor," Lambda added for Cleo's benefit, "is one which promotes the intersection of two or more trains of thought. Bioelectric memory allows stored data to interact according to non-deterministic rules. Basically they are two facets of the same thing; you couldn't have one without the other. The great thing about the M5 was that it solved the co-ordination problem."

"The pity of it is," a rueful Zap carried on, "that we could easily have whipped out the main chip and slipped it into one of our pockets. The rest was just what we configured around it: we could have done that again later."

"But we were too intent on self-preservation," said Lambda.

"So all we've got left now," said Zap, "is my little binary chopper."

"What's that," inquired Cleo.

"It's like Occam's razor, only sharper. It divides and conquers."

Their conversation was ended by the shock of an earthquake. The volcano had finally erupted. Behind them the night sky was lit up by garish orange flames. It seemed that the whole horizon was on fire. A cloud of dense black smoke billowed over the landscape, blotting out the stars. When they discerned tongues of red-hot molten lava spilling out over the edge of the cone, they knew it was time to get moving again, fast.

They pressed ahead at Cleo's best pace and by daybreak had come to Spruckel's Hole, which they approached with extreme stealth since they knew nothing of the androids' downfall.

The still where Spruckel and Bootstrap refined eulogistic acid according to their secret recipe was in the smaller hut, along with vats in which it was stored. They were not too concerned about overpowering the androids and getting at the stuff, but were worried whether there would be enough. If there was only a small quantity, they would have to force the makers to divulge the method of making it and, even if they succeeded, that could involve a lengthy fermentation period.

When Hex and Ascii had not turned up by noon, the appointed hour, they decided to take the place by storm. Zap marched to the door, kicked it open, and charged in wielding his binary chopper.

A scene of devastation greeted them. Spruckel's body lay on the floor, his flesh already pungently decaying and his metal parts starting to rust. Further inside Bootstrap was alive but frozen in a state of suspended animation.

Having appraised the situation and found the stocks of eulogistic acid, which had evaporated, were low, they dragged Spruckel outside for the vulture.

"There's only one thing for it," stated Zap, "we'll have to revive the other android so he can make some more for us."

Where are Hex and Ascii? More trouble next week.

© 1978 Richard Forsyth, Nair Timebinder.

PRODUCT NEWS

مكتبة حرة

Stopping loss of memory

A COMPUTER system can remain active without loss of memory in the event of a mains supply failure using the Trin SP692 power supply from Trio Laboratories.

The SP692 can provide three outputs — 5 volts at 100 amps, 5 volts at 18 amps and 12 to 15 volts at 8.5 amps. If there is a mains failure the last two outputs can be maintained by a battery which is immediately cut in. This supplies power to a AC/DC converter.

Trio pointed out that this technique of reducing the power capacity means that the battery power requirement is only 288 watts. The SP692 measures 8 x 5.25 x 23.1 inches.

Trio Laboratories Ltd (CW), 14 Arkwright Road, Graythott, Hindhead, GU26 4LE. Tel: Hindhead (043 873) 8060.

APL VDU

A MICROPROCESSOR powered APL/Ascii VDU terminal with features that include software controlled display, a 16-function keyboard, a 24 pin connector, and a 24 pin connector. Called Concept APL, it provides full APL overstrike capability along with text editing, line drawing, graphics and a 16-function keyboard. It is a 24 pin connector and a 24 pin connector. It is a 24 pin connector and a 24 pin connector.

Human Designed Systems Inc (CW), 13700 Markham Street, Philadelphia, Pennsylvania 19104. Tel: (610) 315 4444.

Spray etcher for printed circuit boards

NOW available in the UK from PB Electronics (Scotland) is a single- and double-sided spray etcher that is designed for in-house production of professional standard printed circuit boards and for small batch runs.

Paper tape peripherals

The reader in each model can read standard 5, 7 or 8-channel tape in both directions and can also handle 9 or 6 channel typesetter tapes. The perforator operates at 50 cps. The transmission rates are: for sending data very fast from 110 to 9,600 baud, while the receive rates range from 110 to 1,200 baud.

The Model RAR 8051 is a reader/perforator with an RS 232C serial interface, while the RPR 8051 is a perforator-only version. The Model RAR 8085 is a reader/perforator for byte-permille operations, while the RPR 8085 is a perforator-only version of the 8085.

Sintron, Ellinor Ltd (CW), 14 Arkwright Road, Hindhead, GU26 4LE. Tel: Hindhead (043 873) 8060.

Heavy duty punch

DESIGNED for heavy duty production punching is a punch which can handle more than 100 sheets of paper at a time. It is a 24 pin connector and a 24 pin connector. It is a 24 pin connector and a 24 pin connector.

Each punching die is individually controlled by a set-point, and if any of the 28 punches are not required, the operator simply pulls the set-point. It is a 24 pin connector and a 24 pin connector.

Named the BTE 202, it can etch single- or double-sided boards up to 12 x 12 inches in size in under three minutes. The four gallons of etchant in its tank is held at a constant temperature of 120°F in a Titanium 1,000 watt heater.

Twin-sided menfolde distribute a random etch pattern against both sides of the vertically-held board simultaneously. A built-in timer allows the user to set precise timing cycles, and will automatically cut all power to the etch pumps at the end of any pre-set cycle time.

Internal safety switching prevents operation by cutting all power until the see-through lid is firmly in place. Power "on" is indicated by a light. This lamp will not illuminate until the lid is in place, offering a further safety check, the manufacturer said.

Although offered as a complete stand-alone unit, the BTE 202 can be used with computer units that will be available later.

Weighing 60 lbs., it measures 24 x 14 x 20 inches and can be plugged directly into a 240 volt 15 amp socket.

PB Electronics (Scotland) Ltd (CW), 14 Arkwright Road, Hindhead, GU26 4LE. Tel: Hindhead (043 873) 8060.

On the move

THE London office of Geest Microcomputer Systems has moved to larger accommodation at Suite 4, London Road Exchange, Brixton, London, SW9 6BQ. Tel: 01-737 8444.



120 Mbyte moving head disc drive

FROM Hewlett-Packard is a 120 Megabyte moving head disc drive which, although compatible with the HP 3000 computer system, can be adapted for other manufacturers' systems.

Named the HP-7925, it is the usual measure of disc memory speed — in milliseconds. Data is transferred at either 7.5 Megabits or 9.375 Megabits per second.

An HP-7925 master, complete with a buffer, costs £14,970. The manufacturer pointed out that as the controller, which can handle up to eight drives at £1,390 each, is compatible with those used on earlier systems the new

Power supplies

COLLEGE and university electronic laboratories could be interested in an instrument costing £198 that provides essential power supplies and digital signals for electronic circuit development.

Called the Pulse generator and power supply instrument, it eliminates cluttered arrays of bench units according to its manufacturer, Mechtronic Engineering.

It provides three power supplies — TTL, variable CMOS and balanced operational amplifier supply. The pulse rate can vary from 2.2 seconds to 200 nanoseconds, while the pulse width can range from 1.1 seconds to 100 nanoseconds and is limited by the pulse rate setting. Other features include trigger output and square wave output in two phases. It measures 435 mm wide x 90 mm high x 280 mm deep.

Mechtronic Engineering Ltd (CW), 12 Brunel Road, Manor Trading Estate, Benfleet, Essex, SS7 4PS. Tel: South Benfleet (04745) 59131.

Digitiser

USERS of Monroe 1800 series programmable calculators could be interested in the GP-3, a graphic digitiser which is now available from The Science Accessories Corp.

The GP-3 comes with an interface for the 1800 and can convert graphics information into binary or binary-coded decimal data.

The Science Accessories Corp (CW), 375 Kings Highway West, Southport, Queensland 4060, USA. Tel: (061) 420 2000.